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# The TRIPS Agreement and Developing Countries

*Prepared by the UNCTAD secretariat*



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## CONTENTS

|                                     | <i>Page</i> |
|-------------------------------------|-------------|
| LIST OF ABBREVIATIONS .....         | v           |
| FOREWORD .....                      | vii         |
| MAIN FINDINGS AND CONCLUSIONS ..... | 1           |

### *Part One*

#### **The implications of the TRIPS Agreement**

|   |    |
|---|----|
| I. INTRODUCTION .....   | 7  |
| II. A GENERAL FRAMEWORK FOR UNDERSTANDING IPRs .....                      | 13 |
| A. The notion of intellectual property rights .....                       | 13 |
| B. General issues in designing intellectual property rights systems ..... | 14 |
| III. COSTS AND BENEFITS STEMMING FROM THE TRIPS AGREEMENT .....           | 15 |
| A. Market-related costs and benefits .....                                | 15 |
| B. Direct costs stemming from the TRIPS Agreement .....                   | 19 |
| IV. ADOPTING A BALANCED SYSTEM OF IPRs IN ENCOURAGING INNOVATION .....    | 21 |
| V. CASE-STUDIES CARRIED OUT IN SELECTED COUNTRIES .....                   | 23 |

### *Part Two*

#### **The TRIPS Agreement and its specific applications**

|   |    |
|---|----|
| I. INTRODUCTION .....                               | 29 |
| II. PATENTS .....                                   | 30 |
| A. Relevant TRIPS Agreement standards .....         | 30 |
| B. Main implications .....                          | 30 |
| C. Implementation .....                             | 32 |
| D. Direct costs of implementation .....             | 36 |
| III. COPYRIGHTS .....                               | 38 |
| A. Relevant TRIPS Agreement standards .....         | 38 |
| B. Main implications .....                          | 38 |
| C. Implementation .....                             | 40 |
| D. Direct costs of implementation .....             | 41 |
| IV. TRADEMARKS AND GEOGRAPHICAL INDICATIONS .....   | 42 |
| A. Relevant TRIPS Agreement standards .....         | 42 |
| B. Main implications .....                          | 42 |
| C. Implementation .....                             | 43 |
| D. Direct costs of implementation .....             | 44 |
| V. TRADE SECRETS AND CONFIDENTIAL INFORMATION ..... | 46 |
| A. Relevant TRIPS Agreement standards .....         | 46 |
| B. Main implications .....                          | 46 |
| C. Implementation .....                             | 47 |
| D. Direct costs of implementation .....             | 48 |

|   | <i>Page</i> |
|---|-------------|
| VI. INTEGRATED CIRCUIT DESIGN .....   | 49          |
| A. Relevant TRIPS Agreement standards .....                                   | 49          |
| B. Main implications .....  | 49          |
| C. Implementation .....   | 50          |
| D. Direct costs of implementation .....                                       | 50          |
| VII. INDUSTRIAL DESIGN .....  | 51          |
| A. Relevant TRIPS Agreement standards .....                                   | 51          |
| B. Main implications .....  | 51          |
| C. Implementation .....   | 51          |
| D. Direct costs of implementation .....                                       | 52          |
| VIII. COMPETITION ISSUES WITHIN THE TRIPS FRAMEWORK .....                     | 53          |
| A. The TRIPS Agreement's approach to general anti-competitive practices ..... | 53          |
| B. Control of anti-competitive licensing practices and conditions .....       | 54          |
| C. Implementation .....   | 55          |
| D. Issues of administration and enforcement .....                             | 56          |
| <b>References</b> .....   | <b>58</b>   |

#### *ANNEXES*

|  |    |
|--|----|
| 1. Impact of introducing pharmaceutical product patents .....  | 62 |
| 2. IPRs and plant varieties—implications of plant breeders' protection:<br>the case of five Latin American countries ..... | 63 |

#### *LIST OF TABLES*

|  |    |
|--|----|
| 1. Key issues and salient features of the TRIPS Agreement .....                        | 8  |
| 2. Technological trends as reflected in European and Euro-PCT patent applications .... | 31 |
| 3. Main dates in the application of the TRIPS Agreement .....                          | 35 |

## LIST OF ABBREVIATIONS

|                  |   |
|------------------|---|
| Berne Convention | Berne Convention on the Protection of Literary and Artistic Works |
| EMRs             | exclusive marketing rights  |
| EU               | European Union  |
| FDI              | foreign direct investment   |
| GDP              | gross domestic production   |
| IPIC Treaty      | Treaty on Intellectual Property in respect of Integrated Circuits |
| IPRs             | intellectual property rights                                      |
| LDCs             | least developed countries   |
| NICNET           | National Informatics Centre Network                               |
| OECD             | Organization for Economic Cooperation and Development             |
| Paris Convention | Paris Convention for the Protection of Industrial Property        |
| PCT              | Patent Cooperation Treaty   |
| R & D            | research and development  |
| TNCs             | transnational corporations  |
| TRIPS            | Trade-Related Aspects of Intellectual Property Rights             |
| UNCTAD           | United Nations Conference on Trade and Development                |
| UNDP             | United Nations Development Programme                              |
| UPOV             | International Union for the Protection of New Varieties of Plant  |
| WIPO             | World Intellectual Property Organization                          |
| WTO              | World Trade Organization  |

## FOREWORD

This study on the financial and other implications of the TRIPS Agreement for developing countries has been prepared by the UNCTAD secretariat, which was commissioned to do so by the World Intellectual Property Organization (WIPO) pursuant to a decision of the WIPO General Assembly of 3 October 1995.

The report is divided into two parts. Part one assesses the economic implications of the TRIPS Agreement for developing countries, focusing on market-related costs and benefits, as well as the direct costs stemming from the implementation of the TRIPS Agreement. It also summarizes the results of selected country case studies carried out for the purpose of this study. Part two deals with the main disciplines covered by the TRIPS Agreement. It highlights the principal provisions of each of the disciplines discussed, its main economic and legal implications, general issues arising from its implementation and the costs involved in implementing the specific discipline. A section containing summaries of the main findings and conclusions of the study and the key issues that might require further consideration is presented at the beginning of the report. The section also explores the role that international organizations can play in assisting developing countries in their efforts to implement the TRIPS Agreement.

Given the short time since the signing of the TRIPS Agreement, it is premature to assess the full implications of the Agreement. Consequently, and out of necessity, the report is not only selective in terms of the issues discussed but also speculative in parts where concrete evidence is lacking. However, although the report does not claim to cover all the economic and legal aspects of the TRIPS Agreement, it does provide some preliminary assessment of the costs of implementing and enforcing the specific intellectual property rights standards stipulated in the Agreement.

In the preparation of the study, the secretariat of the United Nations Conference on Trade and Development (UNCTAD) drew on its earlier work in this area and carried out country case-studies in selected developing countries. The choice of countries was intended to cover different regions and different levels of economic and technological development. A detailed questionnaire was sent to local experts in the sample countries to review the existing state of the IPR regime in their countries and to assess possible obstacles in the implementation of the TRIPS Agreement. In addition, the secretariat also invited a number of international experts to make contributions and assist in the preparation and finalization of the report.<sup>1</sup>

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<sup>1</sup> The UNCTAD secretariat was assisted in the preparation of this report by a number of international experts, including: Dr. Carlos Correa, University of Buenos Aires; Professor Keith Maskus, Department of Economics, University of Colorado; Professor Jerome H. Reichman, Vanderbilt University School of Law; and Professor Hanns Ullrich, Institut für Rechtswissenschaft, Universität der Bundeswehr München. In the preparation of country case-studies, the secretariat was assisted by local experts. The report was prepared by a team led by Pedro Roffe, assisted by Assad Omer, and comprising Monica Adjivon-Conteh, Siri Dalawelle, Lilian Mercado, Jean-Claude Mporamazina, Taffere Tesfachew, Jean Vanhoutte and Deborah Wolde-Berhan.

## MAIN FINDINGS AND CONCLUSIONS

### *Purpose and thrust of the study*

1. The central objective of this study is to assess the policy implications of the Agreement on Trade-related Aspects of Intellectual Property Rights (the TRIPS Agreement) for developing countries and to delineate an agenda for the transitional period of implementation. The main thrust of the report is that developing countries should be aware of the economic and other implications of the Agreement so that they are able to structure their intellectual property rights (IPRs) systems, including the implementation of the TRIPS Agreement, in a way that enhances dynamic competition and is consistent with their development objectives. Ultimately, therefore, the purpose of the study is to increase the understanding of the TRIPS Agreement in developing countries, particularly the least developed countries, and support the efforts of those countries in the formulation of strategies and the establishment of arrangements conducive to the implementation of the TRIPS Agreement.

2. Three key points arise from the report. First, the TRIPS Agreement requires substantially strengthened protection and enforcement of IPRs in many countries, phased in over varying time periods. The strengthening of the IPR regime is expected to engender positive impacts in developing countries, including more local innovation and additional inward foreign direct investment (FDI) and technology transfer. However, it could also precipitate certain negative impacts, including higher prices for protected technologies and products and restricted abilities to achieve diffusion through product imitation or copying. Secondly, in implementing the TRIPS Agreement, developing nations should aspire to strike and sustain a balance between the needs of innovative firms and their licensees for protection from easy appropriation of their intellectual property, on the one hand, and the needs of legitimate follow-on competitors and consumers, on the other. Thus, in accommodating their economic development goals to the TRIPS requirements, developing countries should maintain an appropriate balance between incentives to innovate and the need for adequate diffusion of technical knowledge into their economies. Thirdly, the impact of the various disciplines of IPRs covered in the TRIPS Agreement will differ among countries depending, *inter alia*, on the existing IPR system, the level of economic and technological development, and the mode of implementation.

3. A number of developing countries, mainly in Asia and Latin America, began the process of changing their legal regimes for intellectual property and supporting institutions in the late 1980s and early 1990s. These reforms have been facilitated by participation in technical cooperation programmes organized by WIPO. In

view of this ongoing reform process, it is not always easy to determine the implications directly associated with the TRIPS Agreement, compared to those that a country would have incurred in the regular process of modernization and improvement of their institutions and legal regimes.

4. In some countries, the TRIPS Agreement will thus impose little in the way of new obligations, as countries had already initiated reforms consistent with the Agreement. For others, the TRIPS Agreement requires substantial changes in norms of protection. In practice, any particular nation's approach to compliance with the TRIPS Agreement will depend on its own innovation strategy and technology development policies. There thus remains scope for implementing the Agreement in a manner conducive to promoting dynamic competition within their own economies, allowing for appropriate legal incentives for information diffusion and local innovation. This approach would require: (a) establishing intellectual property right laws that are consistent with the TRIPS Agreement but do not significantly disadvantage follow-on inventors and creators; (b) instituting incentive structures that will help stimulate innovation at the local level; (c) taking greater advantage of access to scientific and technical information that resides within the global information infrastructure; (d) applying coherent competition policies to curb the adverse effects of the abusive use of IPRs; and (e) improving the innovation system through broader programmes of intellectual skill acquisition and improvement of capacities to absorb new technical information.

### *The TRIPS Agreement entails costs and benefits*

5. The integration of intellectual property rights into the international trading system could mean potential short- and long-term benefits in terms of prospects for enhanced market access and a more conducive framework for foreign investment and transfer of technology. As noted above, however, it could also generate certain negative impacts, including price increases and restrictions on the diffusion of technology.

6. As regards the long term, the effects of the TRIPS Agreement may, to an extent, depend on the demand elasticity of markets. A strengthening of IPRs will induce patent and trademark owners to set prices in different markets based on demand elasticities, which is tantamount to price discrimination. The less elastic the demand in a particular country, the higher will be the price set, although the extent of the increase will depend on how much the intellectual property laws are changed and how quickly they are phased in. Thus, in assessing

the implications of the TRIPS Agreement on a particular market, one important characteristic to analyse is the elasticity of demand for more strongly protected goods, services and technologies.

7. On the supply side, one of the impacts that developing countries are likely to experience from implementing and enforcing the TRIPS Agreement is a reduction in the domestic output and employment of firms which had been producing counterfeit copyrighted and trademarked goods. However, whether reducing or eliminating such activity will generate net economic costs or benefits depends on the specific circumstances. Direct losses in employment and wages must be considered as economic costs. Against these short- to medium-term costs, however, there could in the long run be potential gains in product quality for consumers and users (albeit at higher prices) and gains in employment, wages and taxes in other sectors as labour is reallocated out of counterfeit activity.

8. Industrial structure is also liable to be changed by the TRIPS Agreement in ways going beyond exerting negative pressures on counterfeiting firms. For example, production of pharmaceuticals in many developing countries is dependent on currently existing patent laws, which may be more favourable to domestic producers of competing frontier drugs that have been produced after allowable reverse engineering or compulsory licences. With the TRIPS Agreement in place, such competitive opportunities will be restricted after the phase-in period, suggesting that higher licence fees and prices will result, with potentially lower local production. On the positive side, however, it should be noted that if the TRIPS Agreement induces additional international trade in IPR-sensitive industrial inputs, such trade should embody rising amounts of technology and have a cost-reducing impact that offsets associated price increases. Further, to the extent that stronger IPRs provide greater incentives for additional formal technology transfer through FDI and licensing contracts, there should be a positive growth impact. At least in the long term, the TRIPS Agreement could also have some beneficial impact on domestic innovation programmes.

9. Firms that receive stronger protection for IPRs in international markets have several interrelated means of using the protection to gain greater returns on their intellectual property. These choices include arm's-length trade in protected goods, intra-firm trade, FDI, technology transfer agreements, and establishing R & D facilities in host markets. One of the key arguments made by advocates of stronger global IPRs is that such a system, as embodied in the TRIPS Agreement, would increase FDI in, and associated technology transfers to, developing countries. However, the empirical evidence on this score is mixed. While some studies, using an ad hoc and descriptive econometric approach, found no statistical relationship between membership in IPR conventions and FDI, a recent survey of potential investors from the United States of America, Japan and Germany showed that the intellectual property protection system does have detectable effects on decisions to invest in a given country. Moreover, it was pointed out that intellectual property protection has differentiated impacts on FDI in distinct types of industries and local facilities.

10. To sum up, in assessing the long-term costs and benefits stemming from the TRIPS Agreement, two important points need to be pointed out: first, countries are more likely to benefit from additional technology transfer under the TRIPS Agreement if they coordinate their stronger IPRs with broader modernization programmes for technology development, including human resource and skills development. Second, the effects of TRIPS will vary across countries. Beneficial impacts are most likely in the newly industrializing economies which have developed strong industrial and technological bases that will be increasingly applied to technical innovation. Moreover, the larger developing countries have deeper market structures that will help blunt any anti-competitive results of the TRIPS Agreement. However, in those nations in which technological development is at a rudimentary stage and to which technology transfer and diffusion is limited, with little in the way of offsetting local innovation, there could be a net cost over the longer term. In improving their position, these countries should take full advantage of technical assistance programmes offered by multilateral organizations and Governments of developed economies.

11. In the short term, however, developing countries may experience different degrees of challenges in accommodating their policies and economies to the TRIPS Agreement requirements. One immediate challenge is the task of bringing national laws, institutions and procedures in line with the provisions of the TRIPS Agreement, which could become a demanding endeavour for a number of developing countries. The implementation of the Agreement requires significant improvement, adaptation and enlargement of legal, administrative and particularly enforcement frameworks, as well as human resource development. These tasks will be difficult in some cases and could entail significant expenditures and social implications.

12. The administrative requirements which developing countries must deal with include, *inter alia*: (a) improving the relevant legal framework in line with the general obligations of the Agreement; (b) strengthening or establishing the relevant administrative offices; (c) enhancing enforcement mechanisms for the relevant laws and regulations; (d) extending adequate training; and (e) fostering the capability to monitor transfer of technology arrangements within and between enterprises, as well as ensuring that competition authorities are knowledgeable about potential IPR abuses. The legal and administrative changes are likely to be costly in budgetary terms, as some predictions suggest, and as discussed in this report.

13. It would be unfortunate if implementing the required arrangements were to result in the diversion of excessive resources from basic social and economic programmes, particularly in the least developed countries (LDCs). As the transition period unfolds, this issue will become increasingly important. Thus, the commitments made particularly in favour of the LDCs for technical assistance and financial support need to be translated into action and made effective without delay.

14. In implementing the new intellectual property regimes, LDCs would immediately be confronted with

severe financial and administrative constraints. In terms of a time-frame, the LDCs need to embark on two stages of adaptation, namely immediate tasks after the general entry into force of the TRIPS Agreement, and tasks to be carried out during the remaining ten-year transitional period. The immediate task would be to comply with the provisions on national treatment and those on most-favoured-nation treatment. Both need to be incorporated into the LDCs' national legislation. During the transitional period, the tasks would consist of the following: (a) introducing changes in national legislation in accordance with the standards laid down in the TRIPS Agreement; and (b) elaborating judicial procedures for enforcing laws and an administrative framework, including customs procedures. The latter would deal not only with the upgrading of existing arrangements, but also with establishing additional administrative arrangements for areas not currently covered by the administrative machinery. Given the type, nature and scope of the legal and institutional changes called for by the provisions of the Agreement, the tasks involved in such adaptation could indeed entail considerable costs for LDCs.

#### *Competition policy deserves careful consideration*

15. Many developing countries face growing dependence on foreign sources of technology, the intellectual property rights of which have been strengthened by the TRIPS Agreement. In some circumstances, stronger IPRs could enhance FDI and the transfer of technology. However, the possibility that rights holders could act in ways that are detrimental to competition cannot be denied. In this context, the TRIPS Agreement incorporates a series of pertinent provisions (Articles 7, 8 and 40) that are examined throughout this study.

16. Without the balance of interest that intellectual property systems intend to provide between information creators and users, there is a risk of insufficient investment in technological innovation. If, however, the regulatory balance tips too far in favour of innovators at the expense of competitors, intellectual property rights may tend to misallocate the scarce resources devoted to research and development (R & D) and reduce the efficiencies that flow from reverse engineering and from cumulative, sequential innovation generally. Moreover, the legal barriers to entry that result from overly protectionist measures may gradually weaken the overall competitiveness of national innovation systems<sup>2</sup> with respect to other systems that allow entrepreneurs to operate in less protectionist environments.

17. Developing countries attempting to fine-tune their national innovation system must, therefore, recognize the interplay between IPRs and competition in general. At times, the national interest will lie in resisting intellectual property norms adopted elsewhere that go beyond the TRIPS standards. Sometimes it will mean tilting established norms towards greater competition,

while at other times it will require States to enhance protection in specific areas. One guiding principle may be to stimulate competitive advantages in exploiting spillovers, leakages and the products of reverse engineering by clearly defining exceptions to protection. The benefits of imbuing the various domestic laws that implement international intellectual property standards with a strong competitive focus will vary with the mix of other components in the national innovation system, and especially with measures taken to increase access to scientific and technical knowledge. As implementation proceeds, the TRIPS Agreement standards must also have a measure of flexibility to reflect the variety of interests in different groups of countries, as well as the need for change over time as technology develops.

18. In designing an efficient system of intellectual property rights in compliance with the TRIPS Agreement, developing countries should aim at promoting a competitive enabling environment based on the latest efficient and market-oriented incentives for innovation, creation and diffusion. They should also use the latest means of acquiring and disseminating scientific and technical knowledge by taking advantage of the global information infrastructure. Their IPR systems should also interact coherently with other regulatory and economic systems, including competition law, trade and FDI policies.

19. The interdependence of the intellectual property system and competition works both ways. Competition requires the existence of a fully developed intellectual property system satisfying modern technological and economic conditions. The effective functioning of such a system is dependent on the existence and efficient enforcement of a competition policy that ensures both a competitive market environment in general and the control of anti-competitive practices or misuse of IPRs in particular. The framers of the TRIPS Agreement were clearly aware of this systemic interplay when they adopted Articles 8.2 and 40. In view of the priorities of negotiations during the Uruguay Round, however, they were concerned largely with the establishment of an international intellectual property system only. Articles 8.2 and 40 therefore constitute an appeal to Members to set up a competition policy, at least at the national level, that complements TRIPS standards rather than acting merely as a limit on the use of IPRs.

20. Moreover, this interdependency clearly means that competition policy may not undercut but must assist the proper operation of intellectual property protection by outlawing any anti-competitive conduct. It is for this reason that the TRIPS Agreement expressly requires competition policy to be enforced consistently with its provisions. However, determination of anti-competitive conduct depends on many factors, including the nature, scope and limit of an intellectual property right, the economic and competitive importance of the subject matter protected, the structure of the market affected, the strength and conduct of competitors and the goals of national competition policy. Members may decide for themselves which type of competition policy to follow. Under the antitrust laws of many countries, especially of industrialized countries with a long antitrust law tradition, rules have been developed and interpreted by judicial experiences, which may be taken into account for

<sup>2</sup> In this report, a national innovation system refers to a network of national economic agents together with the institutions, policies and incentive structures that influence their behaviour and performance. For a detailed discussion of the concept of National Innovation Systems, see Lundvall, B. A. (ed.) (1992) and Freeman (1995).

the various approaches to frame the interface between IPRs and antitrust regulation. However, in following such models, attention must be paid to the interrelationship between competition rules in IPRs and the general antitrust law concepts being pursued.

21. The development of standards of competition policy regarding intellectual property is not only a matter of national interest but also an issue of international policy, as regards both establishing the substantive rules and enforcing them. This holds true in present circumstances as markets have become increasingly global, but it is also true as a matter of future policy, since the trend seems to be towards harmonization at the bilateral, regional and possibly the international level. Accordingly, countries, especially developing countries, may have an interest in coordinating their efforts to develop coherent and internationally acceptable antitrust standards in the area of IPRs. Such coordination may contribute to a consensus-building process as to what antitrust rules are consistent with the TRIPS Agreement in the first instance. Further, its results should withstand challenges within the WTO dispute-resolution process based on an allegation of "impairment". Finally, coordination may help to make sure that future harmonization is effected with due regard to developing countries' interests. The comity requirements set forth in Article 40.3 of the TRIPS Agreement with respect to the possible extraterritorial effects of national antitrust enforcement provide a good starting point for coordination discussions, quite apart from the fact that they should be taken seriously as a matter of national interest.

22. Defining and enforcing an adequate competition policy regarding the unilateral exercise or the contractual exploitation of intellectual property protection is not a secondary concern that might await the establishment of a TRIPS-compatible intellectual property system, but rather must go hand-in-hand with it.

23. It is also important to underline that strengthening the IPR system, while bearing some potential for expanding access to trade, FDI and technology, is liable to be of small value for developing countries unless it is done in a coherent framework of broader policies. IPRs should thus be implemented in a way that promotes dynamic competition through the acquisition and local development of technology in an environment which is conducive to growth. In such an environment, stronger IPRs themselves should become a spur to additional growth, otherwise they might result in higher prices and limited growth.

#### *Developing countries need assistance*

24. An important step has been taken with the conclusion of arrangements on cooperation between WIPO and the World Trade Organization (WTO) to assist developing countries in the implementation of the TRIPS Agreement.<sup>3</sup> This report also makes a case for an addi-

<sup>3</sup> See the Agreement between the World Intellectual Property Organization and the World Trade Organization of 22 December 1995 that entered into force on 1 January 1996.

tional important role of relevant international organizations in assisting member countries, particularly the least developed among them, to better understand the options available and the conditions necessary for the full and balanced implementation of the Agreement. It is argued that, in addition to the preparation of technical papers and improvements in the negotiating skills of various agents in the application of the Agreement, international organizations should promote dialogues among different actors, including innovators, producers and consumers of IPRs, public authorities and members of academia from both developed and developing countries.

25. It is evident that the primary and immediate beneficiaries of the implementation of the TRIPS Agreement are likely to be technology and information developers in the industrialized countries. Indeed, the more rapidly and comprehensively the TRIPS Agreement is put into place, the greater will be these benefits. It is therefore not unreasonable to remind industrialized countries that it is in their own interest to assist developing countries in their efforts to implement the Agreement through technical and financial support, as stipulated in the Agreement. This assistance, provided directly and/or through international organizations, should help developing countries achieve proper adaptation, implementation, and general application of the TRIPS Agreement.<sup>4</sup> Several components of such assistance will be important. A non-exhaustive list would include the following elements:

- (a) Assisting countries to understand the options, costs, opportunities and challenges arising from the TRIPS Agreement;
- (b) Preparing them for the various stages of implementation of the Agreement, including the provision of training;
- (c) Collaborating in the dissemination of information on laws and regulations (including relevant judicial cases) concerning transfer of technology, which will be of great importance for countries' understanding of the new trends and developments in the area of intellectual property;
- (d) Strengthening the negotiating capacities of entrepreneurs and Governments in developing countries regarding contract negotiations and other conditions or clauses for transfer of technology, either as providers or as receivers;
- (e) Assisting countries with strong traditions in certain sectors (e.g. artistic and literary work, design, crafts) to fully explore the opportunities provided by the TRIPS Agreement in protecting and exploiting the local intangible assets of their creators, innovators and communities.

<sup>4</sup> For example, UNCTAD IX (May 1996) recommended work on "assisting developing countries, in collaboration with WIPO and WTO, to identify opportunities provided by the TRIPS Agreement, including for attracting investment and new technologies" (see "A Partnership for Growth and Development", TD/377, para. 91(i)).

*Part One*

**The implications  
of the TRIPS Agreement**

## I. INTRODUCTION

26. Against a backdrop of growing concern over differences and inadequacies in IPR systems and the difficulties this situation posed for global exploitation of intellectual assets, countries committed themselves, in the Uruguay Round, to adopting a set of universal standards of protection. The Final Act, embodying the results of the Uruguay Round, contains in annex 1C the Agreement on Trade-Related Aspects of Intellectual Property Rights (the TRIPS Agreement).<sup>5</sup> The breadth of the intellectual property rights (IPRs) disciplines covered in the Agreement is unprecedented at the international level. It supplements the basic WIPO Conventions on intellectual property with substantive obligations and disciplines within the World Trade Organization (WTO). Among these obligations is most-favoured-nation treatment, a novelty in international intellectual property regimes, whereby any advantage a member grants to the nationals of any other country must be extended to the nationals of all other WTO members. It also calls for substantial strengthening of administrative and enforcement procedures. Particular aspects of the Agreement are discussed in detail in part two of this report. However, an overview of the key issues involved and the time-frame for implementation of the requirements is presented in tables 1 and 3.

27. The basic principles of the TRIPS Agreement refer to criteria and objectives regarding the contribution that the protection and enforcement of IPRs should make to the promotion of technological innovation and the transfer and dissemination of technology. The Agreement also refers to measures that countries may adopt to protect public health and nutrition and to promote public interest in sectors of vital importance to their socio-economic and technological development. These principles also establish that appropriate measures may be needed to prevent the abuse of intellectual property rights or practices which unreasonably restrain trade or adversely affect the international transfer of technology. These aspects of the TRIPS Agreement are of particular importance to developing countries.

28. The TRIPS Agreement represents a signal change in international standards for protecting intellectual property required of many developing countries. Ultimately, its implementation is likely to engineer fundamental changes in industrial structure, market competition and growth in many countries. Numerous short- to medium-term impacts could well be negative for poor countries with respect to product prices and the terms of

access to technologies, although these impacts will be muted by the long phase-in periods. However, there could be significant long-term benefits to countries that work within the confines of the TRIPS Agreement to set new intellectual property regimes that adequately protect innovative activity and promote inward technology transfer. In accommodating their economic development goals to the TRIPS Agreement's requirements, developing countries and economies in transition will do well to safeguard an appropriate balance between incentives to innovate and the need for adequate diffusion of technical knowledge into their economies. Thus, TRIPS may be employed in a broad programme of forward-looking technology development to promote beneficial dynamic competition.

29. It should be noted that a number of developing countries, mainly in Asia and Latin America, began the process of changing their legal regimes for intellectual property and supporting institutions in the late 1980s and early 1990s. For example, the list of developing nations that adopted stronger patent legislation at some point between 1985 and 1995 includes Argentina, Bangladesh, Benin, Brazil, Burkina Faso, Chile, China (twice), Colombia, Ecuador, Indonesia, Malaysia, Mali, Mexico, Paraguay, Peru, the Republic of Korea, Thailand and Venezuela.<sup>6</sup> These reforms have been facilitated by participation in technical cooperation programmes organized by WIPO.

30. Attitudes towards intangible property are actually evolving.<sup>7</sup> There appears to be an emerging global consensus that unauthorized copying of copyrighted material (software, music, films, etc.) and trademark products (clothing, cosmetics, and jewellery) for purposes of resale is an illegitimate activity and should be eliminated. Attitudes towards the creation, dissemination and ownership of technological information (production processes for pharmaceuticals, biotechnological products, for example) remain more divided. The TRIPS Agreement provides a framework for countries to design standards that meet its requirements but pay some attention to national preferences and technical capabilities. Its implementation and enforcement should also help attitudes converge over time on the importance of protecting intellectual property.

<sup>6</sup> Information taken from WIPO, *Industrial Property*, various issues.

<sup>7</sup> "Intellectual property protection is an essential component of an environment conducive to the creation and international transfer of technology" (see UNCTAD IX, "A Partnership for Growth and Development", TD/377, para. 37).

<sup>5</sup> The Uruguay Round of Multilateral Trade Negotiations, Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Marrakesh, Morocco, 15 April 1994.

31. The various IPRs that are covered in the TRIPS Agreement include patents, copyrights and related rights, trademarks and related marks, geographical indications, industrial designs, *sui generis* protection for integrated circuits and plant varieties, and trade secrets (undisclosed information). Further, the Agreement discusses means for administering and enforcing these rights, along with policies for controlling their abuse. There is a vast legal and economic literature on IPRs that may be consulted for

full discussion and analysis.<sup>8</sup> Definitions of particular rights and descriptions of the economic logic underlying them are provided in part two of this report, along with extensive analysis of how they are to be protected under the TRIPS Agreement. In this part, a general analysis is presented of the economic implications of the TRIPS Agreement for developing countries.

<sup>8</sup> See, for example, Besen and Raskind (1991), Siebeck (1990), Reichmann (1994), and Maskus and Eby Konan (1994).

TABLE 1

**Key issues and salient features of the TRIPS Agreement**

|   |  |
|---|--|
| 1. <i>Scope</i> (Art. 1)                            | Covers main categories of intellectual property rights (IPRs): copyrights and related rights; trademarks; geographical indications; industrial designs; patents; layout designs of integrated circuits; and undisclosed information.   |
| 2. <i>General obligations/basic principles</i>      |  |
| National treatment (Art. 3)                         | Requires all Members to treat nationals of other countries no less favourably than their own nationals on all matters concerning intellectual property rights, subject to certain exceptions already provided in conventions/treaties related to IPRs.   |
| Most-favoured-nation treatment (Art. 4)             | Advantages, privileges granted by a Member to the nationals of any other country should be extended unconditionally to the nationals of all other Members.   |
| Exhaustion of intellectual property rights (Art. 6) | For the purposes of dispute settlement, nothing in the Agreement shall be used to address the issue of the exhaustion of IPRs, provided there is compliance with national treatment and most-favoured-nation treatment.  |
| Basic objectives and principles (Arts. 7 and 8)     | The protection and enforcement of IPRs should contribute to the promotion of technological innovation and to the transfer and dissemination of technology. They should also contribute to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare and to a balance of rights and obligations. The Agreement allows members to adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development. At the same time, appropriate measures can be taken in order to prevent the abuse of IPRs or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology. |
| 3. <i>Standards</i>                                 |  |
| a. <i>Copyrights and related rights</i>             |  |
| Relation to the Berne Convention (Art. 9)           | All members are required to comply with the substantive provisions of the Berne Convention except for the obligation on moral rights. Eligible works must be protected on the basis of their expression as a literary or artistic work, not on the basis of ideas, procedures, methods of operation or mathematical concepts as such.  |

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| Protection of computer programs and compilation of data (Art.10)                           | Computer programs are protected (for the normal period of literary works, if the term is calculated on the basis of life of the author plus). Compilations of data are also protected under the Agreement.  |
| Rental rights (Art. 11)  | Members shall provide to authors the rights to authorize or to prohibit the commercial rental of their works to the public and for cinematographic works unless commercial rental has led to widespread copying which is materially impairing the reproduction rights.  |
| Protection of performers, producers of phonograms and broadcasting organizations (Art. 14) | Specific provisions are introduced for the protection of performers and the term of protection is extended (50 years) (as compared to the Rome Convention).   |
| <b>b. Trademarks</b>   |   |
| Protection of service marks (Arts. 15 and 16)  | Provides equal treatment to trade and service marks. Under certain circumstances also provides protection against use of dissimilar goods and services. No cancellation for reason of non-use before three years of non-use (if use required to maintain a registration).   |
| Protection of well-known marks (Art. 16)   | Well-known marks must be protected even when not used in a country. In determining whether a trademark is well known, the knowledge of the trademark in the relevant sector of the public is to be taken into account (Art. 16.2).  |
| Elimination of restrictions on use of trademarks (Art. 20)                                 | Use of trademarks is not to be encumbered by special requirements, such as use with another trademark.  |
| <b>c. Geographical indications</b>   |   |
| Geographical names (Art. 22)   | Provides means to prevent use of geographical direct or indirect names from misleading the public as to the true origin of the good or which constitutes an act of unfair competition.  |
| Additional protection (Arts. 23 and 24)  | With regard to wines and spirits, protection must be provided even where there is no threat of the public being misled as to the true origin of the good. A multilateral system of notification and registration will be established for wines eligible for protection.   |
| <b>d. Industrial designs</b>   |   |
| Term of protection (Arts. 25 and 26)   | For industrial designs, a protection of at least 10 years is required. Special provisions on textile designs which leave each Member to decide whether to provide protection through copyright law or industrial design law.  |
| <b>e. Patents</b>  |   |
| Scope of protection (Art. 27)  | Protection should be available for any inventions, whether products or processes, in all fields of technology. Inventions that threaten public order or morality need not be patented, provided the commercialization of such inventions is also prohibited. Most biotechnological inventions must also be protected, but plants and animals that are essentially biological processes for the production of plants and animals (excluding micro-organisms and microbiological processes) may be exempted from patent protection. |
| Non-discrimination (Art. 27.1)   | The Agreement requires non-discrimination in the granting of patents and the enjoyment of rights in relation to the field of technology, the place of invention and whether patented products are imported or locally produced.   |

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| Term of protection (Art. 33)   | The duration of protection must not be less than 20 years from the date of filing of the patent application.  |
| Other uses without authorization of the patentholder (Art. 31)         | In principle, no restrictions are placed on granting compulsory licensing and government use of patents. However, these practices must respect a number of conditions to prevent patentholders' rights being undermined. Authorization of such use should be considered on its individual merits. The detailed conditions for granting these authorizations are listed in the Agreement.      |
| Process patents (burden of proof) (Art. 34)                            | Reversal of the burden of proof in civil proceedings relating to infringements of process patent is to be established in certain cases.   |
| Plant varieties (Art. 27)  | Plant varieties, including seeds, must be protected through patent or alternative <i>sui generis</i> means.   |
| f. <i>Layout designs of integrated circuits</i> (Arts. 35-37)          | Substantive provisions of the Washington Treaty must be respected with a number of additional obligations: scope of protection includes not only the protected chip, but also articles incorporating it. Term of protection must be 10 years. An "innocent infringer" must be free from liability, but once he has received notice of infringement, he is liable to pay a reasonable royalty. |
| g. <i>Undisclosed information and test data</i> (Art. 39)              |   |
| Protection of trade secrets  | Undisclosed information (or trade secrets) must be protected against acquisition, use or disclosure in a manner contrary to honest commercial practices. To benefit from such protection, information must be secret, have commercial value owing to such secrecy, and have been subject to reasonable steps to keep them secret.   |
| Protection of test data  | Test data provided by a company in order to obtain marketing approval for pharmaceutical and agricultural chemical products must be protected against unfair commercial use; they must also be protected against disclosure, except where necessary to protect the public or unless steps are taken to ensure that the data are protected against unfair commercial use.                      |
| h. <i>Anti-competitive practices in contractual licences</i> (Art. 40) |   |
| Licensing practices  | The Agreement recognizes that countries may specify in their domestic legislation the commercial licensing practices that constitute an abuse of intellectual property protection, and take steps to address these through appropriate measures.  |
| Consultations among members  | Members must cooperate with each other, including through the provision of information, in investigations of alleged abuse of intellectual property rights that have international dimensions.  |
| <br>   |   |
| <b>4. Enforcement</b>  |   |
| a. <i>General obligations</i> (Art. 41)                                | Members must provide effective means of action for any right holder, foreign or domestic, to secure the enforcement of his/her rights, while at the same time preventing abuse of the procedures.   |

- b. *Procedures* (Arts. 43-50)
- The Agreement specifies procedures for civil and judicial action, including means to produce relevant evidence. Civil remedies that must be available must include injunctions, damages and destruction of infringing goods or disposal of these outside the channels of commerce. Provisional measures must be available to prevent infringing activity and to preserve relevant evidence. Judicial authorities must have the authority to adopt provisional measures *inaudita altera parte*.
- c. *Customs cooperation* (Art. 51)
- Right holders must have the means to obtain the cooperation of the customs authorities in preventing imports of pirated copyright and counterfeit trademark goods.
- d. *Criminal procedures* (Art. 61)
- Criminal procedures and penalties must be available in case of wilful trademark-counterfeiting or copyright piracy on a commercial scale.
- e. *Indemnification of the defendant* (Art. 48)
- Compensation for the abuse of enforcement measures are specified, including payment of defendant expenses, which include appropriate attorney's fees.
- f. *Acquisition and maintenance of IPRs* (Art. 62)
- Procedures or formalities for obtaining intellectual property rights should be fair, reasonably expeditious, not unnecessarily complicated or costly, and generally sufficient to avoid impairment of the value of other commitments.
5. *Dispute settlement* (Arts. 63 and 64)
- The new WTO dispute settlement procedures will apply to the TRIPS Agreement.
- Faster procedures
- Dispute settlement procedures will be faster than in the GATT because of time limits at each stage of the process. There is no scope for interested parties to block the process of the adoption of recommendations of panels.
6. *Transitional arrangements* (Art. 65)
- One-year transitional period for all countries to apply the Agreement.
- Developing countries
- Developing countries can delay application of the Agreement for another four years, except for national treatment and MFN obligations. These countries are entitled to an additional five-year period for introducing product patents in areas of technology (pharmaceuticals and agricultural chemicals) that are not protected at the date of application of the Agreement. This 10-year delay in the implementation of these provisions should be seen in conjunction with Art. 70.8 of the Agreement which provides, in respect of pharmaceutical and agricultural chemical products, the following arrangements: any member who does not make available, as of 1 January 1995, patent protection for the pharmaceutical and agricultural chemical inventions must accept the filing of applications for patents for such inventions (establishment of a "mailbox" for patent applications claiming such product patents), and must do so from 1 January 1995, even if it is a country which may delay the application of the Agreement, as indicated above. Once the Agreement becomes applicable in that country, it must take a decision in respect of the application (either reject it or grant a patent) but, in doing so, it must apply (retroactively) the criteria of patentability as laid down in the Agreement. If its decision is to grant a patent, that patent will be available for the remainder of the term (Art. 70, para. 8). However, an "exclusive marketing right" (for a period of five years) must be granted concerning the invention which is the subject matter of the application if, after 1 January 1995, in another country a patent application has been filed and a patent granted for that product and marketing approval obtained in such other Member (Art. 70, para. 9).

Least developed countries (Art. 66)

Least developed countries are entitled to delay application of the Agreement, except for national treatment and MFN until 1 January 2006. However, they are also covered by the requirement to protect all pharmaceutical inventions made after the entry into force of WTO.

7. *Technical cooperation* (Art. 67)

The Agreement calls upon developed country members to provide technical and financial assistance in favour of developing country members on mutually agreed terms and conditions.

## II. A GENERAL FRAMEWORK FOR UNDERSTANDING IPRs

32. IPRs are a highly complex area, involving elements of economics, law, international relations, politics and ethics. This section of part one focuses on economic issues, and more specifically on the economic implications of the TRIPS Agreement. In order to effectively ascertain such economic implications and the scope of policy options compatible therewith, it is appropriate to bring out the basic economic notions underlying the provisions that are contained in the TRIPS Agreement. Such a discussion, which is presented in the next two sections, cannot by necessity be comprehensive, but rather attempts to highlight the basic economic arguments regarding property rights that pervaded the negotiation of the Agreement at the Uruguay Round.

### A. The notion of intellectual property rights

33. It helps in understanding the notion of intellectual property rights, as stipulated in the TRIPS negotiations, to first consider the economics of rights in tangible property, such as land. With no property rights, a piece of land would suffer from both static and dynamic misuse. The static problems involve both overuse from congestion, arising from the fact that users rationally ignore costs they impose on others, and a lack of access to economies of scale. The dynamic costs arise from degradation because there is no incentive to improve the resource if someone else might be allowed to appropriate the land later without compensation. These problems clearly call for well anticipated rights in the property for its owner to: (a) decide on its uses, the number of users and the price of doing so; (b) improve the asset; and (c) transfer these rights with a minimum of interference. Conventional economic theory suggests that if contract rights to property are clearly assigned and enforceable, then competing users will jointly achieve optimal static use and dynamic investment in tangible property through relative prices set in contracts. This idea assumes that there are low transaction costs to setting contracts. Here, the role of government is to enforce rights to existing property.

34. Sound social policy calls, however, for a number of exceptions to full rights in tangible property. For example, there are public-use interests, such as zoning, eminent domain and environmental restrictions, where the public need for development outweighs the owner's rights, although economists would argue for compensation to be paid in such cases. Further, property rights do impose costs in addition to the benefits mentioned above. One cost is rent-seeking to obtain a valuable property right, such as a licence to import a good or ownership of land near a major development. Rent-seeking in this case is defined in terms of the waste of

resources that accompanies attempts to gain ownership of an asset. A second is enforcement cost, such as the need for fences and police, which can be substantial. Thirdly, there is the social cost of restricting private use if property has a public-good character, which is a difficult issue for public policy to resolve. Finally, the costs of transferring rights may be so high that land use does not easily adjust to changing demands.

35. Now consider the same issues with respect to intellectual property, which is economically valuable information. In general, an IPR is the legally enforceable power to exclude others from using the information created (or to set terms on which it can be used). This definition may seem natural but problems emerge in designing a system of IPRs. Information is essentially a public good in two separate but important ways. First, it is a non-rival in consumption because one person's use of it does not diminish another's potential use. Consider a new production technology, a symphony, a brand name or a computer programme, all of which may be used equally by multiple individuals. Second, it may be difficult to exclude unauthorized use of information without legal protection. Thus, if an intellectual creation is potentially valuable but easily copied or used by others, there may be inadequate incentives to incur the costs of developing it. Moreover, there is a public interest in permitting wide use of the information. Indeed, the interest is strong in that the marginal economic cost of providing another blueprint, diskette or video tape to another person may be very low, even though investment and development costs may be substantial. There are therefore similar basic trade-offs in the cases of both tangible property and intellectual property. On the one hand, *static efficiency* requires providing wide access to users at (probably low) marginal cost. On the other hand, *dynamic efficiency* calls for providing incentives to improve property or invest in new information for which the value exceeds development costs.

36. Regarding the costs of IPRs, rent-seeking, as defined above, can be a serious problem because the asset is being invented or discovered anew and there is typically no ownership until the creation is made. Thus, a strong IPR system can cause costly duplication of investment in R & D (that is, patent races), plus further costs in asserting ownership rights. Furthermore, the fact that it is inherently costly to exclude free-riders from exploiting the public-good nature of information suggests that enforcement costs may be high. Finally, the costs of transferring rights to information can be high if there is uncertainty about the value of the information or difficulties in monitoring its use by those who buy or license it.

## B. General issues in designing intellectual property rights systems

37. On the basis of these considerations, advocates of IPR systems assert that the main goal of such a system should be to create economic incentives that maximize the discounted present value of the difference between the social value and social costs of information creation and transfer. The social value of information may differ from the private market value because of potential market failures in invention programmes. For example, the social value of an invention would exceed its private revenues if there were positive externalities, such as network gains from software standards. Similarly, excess social value exists in cases where spillover cost reductions to other uses are not compensated by the market. Risk aversion in undertaking R & D programmes also results in insufficient private incentives to innovate at socially optimal rates. However, social value could be less than private value if IPRs create strong market positions that encourage limited production, inadequate information diffusion, and high prices. Such strategies may enhance returns to innovation but they lower consumer benefits and restrict innovation by rival firms.

38. Whether social values exceed private market valuations for particular innovations depends on various factors, including demand patterns, the cost-reducing impacts of new technologies, and the competitive nature of market structures. Evidence from industrialized countries indicates that there are often large spillover benefits from major inventions, while patents on smaller inventions tend not to confer significant market power (Utterback, 1987). In consequence, there is often a presumption that economies with strong or emerging innovative capabilities need sound and well understood IPRs, on the grounds that private markets are inadequate to induce socially optimal innovation and cultural creation.

39. It is insufficient, however, only to consider the social and private values of innovation. Countries must also account for the costs of generating new intellectual assets. Social costs include the costs of development, including duplication of R & D expenditures, the private and public costs of administration and enforcement of IPRs, and rent-seeking costs. These costs can be significant, thereby giving support to the argument for weaker IPRs. However, this conclusion must be carefully qualified. For example, expenditure duplication could also

happen without IPRs and the private costs of attempting to exclude potential users could be higher than those for public enforcement.

40. These are complicated issues and it is generally impossible for authorities to tailor protection of intellectual property in a precise manner, particularly in light of the substantial uncertainty that accompanies many acts of invention. It follows that IPRs are based on general rules, including the form of protection and public-interest limits on the scope of protection, rather than on a case-by-case grants system. This approach leaves a significant role for the courts in interpreting IPRs.

41. It can thus be stated that, in designing an efficient, rules-based system of intellectual property rights, the following objectives should be pursued:

- (a) To the extent possible, the system should be based on efficient and market-oriented incentives for innovation and creation;
- (b) The system should attempt to minimize the costs of innovative activity;
- (c) The system should provide for timely disclosure of innovation or creation and also for reasonable fair use with economic and social goals in mind;
- (d) The scope and length of protection should be limited in order to strike an appropriate balance between creation and dissemination;
- (e) There should be coherent interaction with other regulatory or economic systems, including anti-trust policy, to avoid competitive abuses of IPRs, trade and FDI policies affecting the values of IPRs, and general technology development strategies.

42. In this regard, it is possible for nations to build IPR systems that are either excessively open to imitation and diffusion, thereby diminishing original incentives to innovate, or excessively closed to imitation and diffusion, thereby granting strong market positions that reduce the spread of technological knowledge. Both solutions are liable to limit economic growth in the long run.<sup>9</sup>

<sup>9</sup> Indeed, Maskus and Penubarti (1995) analyse and demonstrate the dependence of patent regimes on levels of economic development.

### III. COSTS AND BENEFITS STEMMING FROM THE TRIPS AGREEMENT

43. For the sake of analysis, the costs and benefits stemming from the TRIPS Agreement are divided into two categories, namely market-related costs and benefits and direct costs. The former refers to impacts on prices, market structures, terms of access to technologies and products, and FDI. As this review will demonstrate, such impacts are, in principle, intimately related to variations in IPRs. However, theoretical predictions are often ambiguous, while empirical evidence provides little systematic or concrete guidance.

#### A. Market-related costs and benefits

44. Intellectual property is owned mainly by firms in industrialized countries. While some industrializing nations have begun producing new technologies and technological products, developing countries, in general, are net importers of technical knowledge. This statement must be qualified by noting that many developing nations have strong traditions of creating literary and artistic work and crafts, the values of which could be enhanced by stronger copyrights and trademarks. Considering developing countries as importers of information, however, one anticipated consequence of their adopting a stronger protection regime would be an increase in royalty payments to foreign title holders. Furthermore, the exclusive position of title holders of IPRs allows them to raise the prices paid by consumers and users of industrial technologies. Particularly sensitive products and industrial inputs such as pharmaceuticals and agro-chemicals raise the largest fears as regards significant price increases. In addition, given the vital importance of information and communication for diffusion of information technologies, computer software constitutes an essential input into production and trade. Thus, the cost of access to computer software and related programmes may be of concern to importing countries as well. At the same time, it must be recognized that, if stronger protection under the TRIPS Agreement induces more use of foreign advanced technologies, there would be a beneficial impact in terms of lower production and transaction costs in the user countries.

45. Some perspective must be provided on these potential market costs. IPRs do not necessarily generate monopoly market positions that result in high prices and limited availability. They are in many ways similar to a standard property right, in that they define the conditions within which a right owner competes with rivals. Except in particular sectors, cases are infrequent where a patent owner or copyright holder becomes a strong monopolist by virtue of facing little competition from other products and technologies, including new ones that do not infringe his rights. Much depends on the scope of the pro-

cess and the product claims protected, and on the technical characteristics of the inventions. For example, a patent grant accompanies a disclosure requirement in which the technical aspects of patents are laid open and others may use the information to develop inventions that do not violate the claim. The narrower the claim, the easier it is to invent around the patent. Thus, IPRs may help spur dynamic competition even if they may at times limit competition among existing products. Advocates of strong IPRs argue that they create competition with long-run consumer benefits. For example, survey evidence (Mansfield, 1985) indicates that patent disclosure requirements are important means of diffusing technical information to competitors within a short time. Often, it is not difficult to use the information to develop a new product or process that competes with the original. This incremental nature of innovation is a crucial characteristic of most technical progress. It generally builds dynamic competition rather than investing considerable market power. Thus, patents and other IPRs can raise the costs of imitation but typically do not materially retard competing product introduction.

46. There are further complicated trade-offs regarding the effects of stronger international IPRs on pricing and licensing terms, which are the means by which innovators cover R & D costs and perhaps earn additional profits. Patents, for example, are beneficial to the extent that they afford more certainty to firms and lower the costs of transferring technology. Patents and trademarks also facilitate the monitoring of the quality-control efforts of licensees. If stronger patent laws induce more use of international licences, there are greater incentives and possibilities for adaptive innovation in user firms and countries, resulting in spillover growth. Unfortunately, stronger patents may have the opposite effect on licensing in some situations. Further, patent exploitation can be costly because of potential licensing abuses, including tied sales, which extend protection to unpatented items, marketing limitations or market-sharing deals, and patent pooling or cross-licensing of major technologies to restrain competition. Broad patent claims on a key area of technology and strict limitations on fair-use decompilation of software protected by copyright are examples of IPRs that generate market power. How these benefits and costs will evolve is often not clear in any national context. What is clear, however, is that there is an important linkage between IPRs and competition policy, as part two will examine in detail.

47. With this background, there is a need to consider the characteristics of technology-importing countries that will influence the net gains or losses from implementation of the TRIPS Agreement. It should also be noted that the manner in which the TRIPS Agreement is

implemented itself affects these impacts, as is discussed in part two.

#### *Issues related to market structure*

48. Market structure encapsulates both demand characteristics and competition among firms. A strengthening of IPRs will induce patent and trademark owners to set prices in different markets based on demand elasticities, which is tantamount to price discrimination. The less elastic the demand in a particular country, the higher will be the price set, although the extent of the increase depends on how much the intellectual property laws are changed and how quickly they are phased in.<sup>10</sup> Thus, one important characteristic to analyse is the elasticity of demand for more strongly protected goods, services and technologies. Among the numerous determinants of elasticities discussed in the economic literature, four bear mentioning here.

49. First, the extent of product and technology differentiation helps determine consumer and user choice-sets, suggesting that economies with stronger incentives for such competition may pay lower mark-ups on goods protected by IPRs. Similarly, if the country imposes direct or indirect limits on domestic competition, the price impacts of stronger IPRs could be correspondingly more damaging. An extreme example here is that of some least developed countries that have little scope for domestic production of technologically sophisticated goods, such as pharmaceuticals and software, and have to rely on imports for the supply of such goods.

50. Secondly, price discrimination requires effective market segmentation across countries. Stronger IPRs in themselves serve as measures for supporting such segmentation, as in the case of patents that strictly control parallel imports in different nations. So also do trade and investment restrictions. The potential impact of the TRIPS Agreement on developing countries will therefore depend on their policy stances concerning international competition, including the treatment of parallel imports and exhaustion in the context of defining exclusive rights and trade liberalization programmes in general.

51. Thirdly, demand elasticity is a function of allowable regulations on prices or quantities in key products such as pharmaceuticals. Such regulations should be firmly grounded in relation to economic and social objectives and designed to minimize disruptions to effective competition.

52. Finally, demand is closely related to the real income of consuming nations. Growth in real per capita incomes tends to shift expenditure shares more toward advanced technologies, products and services, which may in turn be more intensive in the use of IPRs.<sup>11</sup> However, price elasticities for such elements tend to rise due

to greater product variety as markets deepen. Thus, economic growth is likely both to raise each country's interests in providing stronger IPRs and to reduce the relative price impacts of doing so.

53. On the supply side, one of the first impacts that developing countries are likely to experience from implementing and enforcing the TRIPS Agreement is a reduction in the domestic output and employment of firms that had been producing counterfeit copyrighted and trademarked goods. There are no systematic studies of this issue, although anecdotal evidence claims that such counterfeiting is a common activity in particular sectors and in both developed and developing countries.<sup>12</sup> According to some estimates, in terms of value, the market loss through piracy is greater in developed than in developing countries.<sup>13</sup> That aside, however, whether reducing or eliminating such activity will generate net economic costs or benefits depends on the specific circumstances. As discussed below, it will initially be costly to devote public administrative resources to this task. Direct losses in employment, wages and tax receipts (if such activities are taxed) must also be considered as economic costs. Against these short-term costs, however, there could in the long run be potential gains in product quality for consumers and users (albeit at higher prices) and gains in employment, wages and taxes in other sectors as labour is reallocated out of counterfeit activity. It is to be noted that it is possible that, with stronger copyrights and trademarks, foreign rights holders may well choose to license such production to new or existing domestic firms. Indeed, there is evidence from some countries that have reformed their IPR systems that infringing firms can readily shift to legitimate production under the new legal regime, especially in sectors with low entry barriers. The impact on wages and employment depends on market characteristics, but it could conceivably be positive. Moreover, there is a gain associated with the fact that legitimate copying activities may actually require fewer resources than counterfeited production. To the extent that labour must be transferred out of producing such goods, the ability to effect this transfer depends on the vibrancy of economic growth and the skill basis and industrial depth of the economy. Finally, as noted earlier, one possible positive outcome of enforcing stronger copyrights and trademarks could be the emergence of more domestic artistic and literary creation.

54. Industrial structure is liable to be changed by the TRIPS Agreement in ways going beyond exerting negative pressures on counterfeiting firms. For example, production of pharmaceuticals in many developing countries is dependent on currently existing patent laws, which may be more favourable to domestic producers of competing frontier drugs that have been produced after allowable reverse engineering or compulsory licences. With the TRIPS Agreement in place, such competitive opportunities will be restricted after the phase-in period, suggesting that higher licence fees and prices will result,

<sup>10</sup> Note that firms may sometimes set low prices in order to share information with particular users, such as universities, although this practice also has the effect of building user loyalty. Prices may also be affected by government ceilings for such items as pharmaceuticals and information provided for educational and research purposes.

<sup>11</sup> While this proposition seems reasonable, it has not been investigated in the literature.

<sup>12</sup> Primo Braga (1996) discusses this issue in some detail and notes evidence from the United States Government and private sources that the extent of counterfeiting in some goods in certain nations is substantial.

<sup>13</sup> See *The Wall Street Journal Europe*, 20 May 1996; and *The Economist*, 27 July 1996, pp. 59-61.

with potentially lower local production. Theoretical models demonstrate, however, that the extent of these effects depends strongly on the existing market structure, including the output shares of local infringing firms and legitimate firms (Maskus and Eby-Konan, 1994; Subramanian, 1995b). Indeed, under the most realistic assumptions, the anticipated price increases from stronger pharmaceutical patents are relatively modest in large developing economies such as Argentina, India, Brazil and Mexico. (A survey of recent work in this area is provided in annex 1.) Moreover, much depends on the competitive reaction of foreign rights holders and the technological capability of local firms. It is possible that stronger patents will encourage more product development by local firms based on disclosed foreign patents and on additional R & D efforts. One might also anticipate additional movement towards partner relations between domestic firms and foreign rights holders, with ambiguous direct impacts on local employment.

*Modes of supply by rights holders: trade, foreign direct investment, and technology transfer*

55. Firms that receive stronger protection for IPRs in international markets have several interrelated means of using the protection to gain greater returns on their intellectual property. These choices include arm's-length trade in protected goods, intra-firm trade, FDI, technology transfer agreements, and establishing R & D facilities in host markets. These reactions are also important components of market structure in recipient nations, affecting their gains and losses from TRIPS.

*International trade*

56. International trade in products that are sensitive to IPR protection has grown dynamically in recent years (Maskus, 1993). In theory, differences in IPRs could significantly affect both intra-firm and arm's-length trade flows through a number of mechanisms. Recent empirical work has provided important evidence on this point. Ferrantino (1993) found that a country's adherence to international IPR conventions had no effect on United States inter-firm trade but a weak negative association was observed for United States intra-firm exports to foreign affiliates. Such "transfer exports" were found to be "higher to overseas affiliates in countries without IPRs memberships than with IPRs memberships" (p. 328). As Primo Braga (1996) points out, this conclusion suggests that United States firms prefer to keep production within the United States rather than risk loss of proprietary information by expanding production in affiliates in weak IPR countries. One consequence is that stronger IPRs, *ceteris paribus*, would induce more FDI and vertical integration, with less intra-firm trade.

57. In a more refined specification, Maskus and Penubarti (1995) estimated bilateral trade equations for 28 three-digit ISIC manufacturing industries in 1984, using 22 OECD countries as exporters and the same countries plus 49 others, primarily developing countries, as importers. Bilateral imports in each sector were regressed across countries on several variables from a general equilibrium model of trade, including trade restrictions and economic distortions. They included an index of patent strength in each importing country—corrected

for measurement error and endogeneity—and also interaction of the index with dummy variables for country size in developing markets. The evidence from the study clearly suggests that stronger patent laws attract greater amounts of bilateral imports into larger developing countries. The implied elasticities of imports with respect to patent strength are positive, but small. The results in a companion study indicate that, as global patent strength increases owing to the implementation of the TRIPS Agreement, global trade in patent-sensitive goods could expand by perhaps \$15 billion to \$25 billion a year (Maskus and Penubarti, 1996). This is a relatively small estimate but an effect that has not otherwise been recognized. It is also static in nature and does not capture any dynamic gains in trade that might ensue, particularly in light of the embodied technological advances (if not know-how) in imports of machinery and other technological inputs.

*FDI and technology transfer*

58. One of the key arguments made by advocates of stronger global IPRs is that such a system, as embodied in the TRIPS Agreement, would increase FDI in, and associated technology transfers to, developing countries. Theoretical analysis suggests that the impact of protecting IPRs is likely to be positive, although relatively unimportant in relation to other determinants of FDI.<sup>14</sup> Firms become transnational corporations (TNCs) because of their profit-maximizing decisions to exploit some combination of ownership, location or internalization (OLI) advantages (UNCTAD, 1996a). Ownership advantages refer to some product or technology characteristic specific to a firm that gives it a cost or marketing advantage over its rivals. Herein lies a direct role for patents, copyrights and trademarks, which protect the returns to such advantages, in inducing FDI. As patents become stronger in foreign markets, for example, firms become more likely to exploit them through FDI in those markets.

59. Locational advantages refer to characteristics of countries towards which FDI might be aimed. Important among these would be macroeconomic stability, productive infrastructural development, market size and growth, and factor endowments (as proxied by factor prices such as low wages).

60. Finally, internalization advantages refer to the possibility of firms economizing on transactions and contracting costs by handling business matters within firm boundaries. For example, a common problem facing firms is that, if they license their technology or product to an unrelated foreign company, it may be difficult to prevent that company from revealing the technology or eroding product quality unless contracts are well enforced. The licensing firm may prefer to deal with a subsidiary over which it has greater control or it might choose simply not to service the market except through arm's-length exports. The impact of IPRs here on FDI is negative, as stronger patents and trademarks reduce these contracting costs, causing smaller needs for inter-

<sup>14</sup> A review of a standard analytical paradigm on this issue is available in Dunning (1980).

nalization through FDI. It should be kept in mind, however, that these same policies increase returns to exploiting ownership advantages through FDI, so that investment could well increase.

61. The impact of the TRIPS Agreement on FDI could be of paramount importance because FDI generally embodies new technology, the acquisition of which is a key component of any country's technology development programme. However, to date, there is little conclusive evidence that strengthened intellectual property protection would consistently expand the transfer of technology to developing countries. Key determinants of technology transfer (both through FDI and through arm's-length licensing) include the costs of making such transfers, which depend on local technological capability. This capability refers to factors such as skill availability, technology supply structures, R & D capacity, enterprise-level competence and institutional and other supporting technological infrastructures.<sup>15</sup>

62. As a general rule, very poor countries receive little FDI and technology transfer, despite their low wages, because the costs of such transfers are high in relation to the ability of the countries to absorb them, while concerns abound about instability in those nations.<sup>16</sup> Countries of intermediate incomes receive rising amounts of vertical FDI due to relatively low wages in conjunction with lower costs of technology transfer and greater technical capacities. Finally, developed economies receive falling amounts of vertical FDI but sharply rising amounts of horizontal FDI because of deeper market structures supporting product differentiation.

63. In brief, some authors suggest that stronger IPRs are likely to have a positive impact on FDI, although, as mentioned above, the effect is probably minor in relation to that of other factors. The empirical evidence on this score is mixed. Ferrantino (1993) found a limited impact through intra-firm trade, as noted above. Kondo (1995), on the other hand, using an ad hoc and descriptive econometric approach, found no statistical relationship between membership in IPR conventions and FDI. The survey conducted by Mansfield (1994) showed that the intellectual property protection system does have detectable effects on decisions to invest in a given country. The survey cited a number of problems as signs of inadequate intellectual property protection, including, *inter alia*, the limited scope of protection and inadequate enforcement measures. Moreover, it was pointed out that intellectual property has differentiated impacts on FDI in distinct types of industries and local facilities. For example, its role is considered to be important in the pharmaceutical and chemical industries. Further, according to a related survey, United States, German and Japanese firms which are considering investment in R & D activities and manufacture of final products are reluctant to invest in or transfer technologies to countries with weak intellectual property protection. However, those engaged in distribution appeared to be less concerned with the level of IPR protection (Mansfield, 1995).

<sup>15</sup> UNCTAD (1996b) provides a comprehensive review of studies of the theory and evidence of the determinants of technology transfer.

<sup>16</sup> For an analysis of recent trends in FDI flows, see UNCTAD (1995c).

64. Moreover, recent work appears to support the conclusion that the international structure of FDI depends on country-specific levels of IPRs (Maskus, Blyde and Penubarti, 1996). In a simultaneous econometric framework in which United States firms with patentable inventions are able to exploit them internationally through four interrelated decisions (applying for patents, exporting, selling from existing subsidiaries, and expanding subsidiaries) it was found that the strength of patent laws in developing countries exerts a strongly positive influence on sales and FDI. These equations were also controlled for market size, trade restrictions and local R & D capacities. It therefore seems that, *ceteris paribus*, countries with stronger IPRs do attract more investment interest from North American TNCs.

65. Contractual transfers of technology occur both through FDI and licensing agreements between the owner of the technology and subsidiaries, joint ventures and unrelated firms abroad. Primary determinants of the extent of technology transfer include profit opportunities, costs of making transfers, and regulatory policies. IPRs again are intimately related, in principle, to firms' decisions to license technology. The TRIPS Agreement effectively expands the choice for licensing decisions in developing countries because it limits the ability of countries to impose working requirements and to issue compulsory licences. A worrying implication of this limitation is that foreign firms may choose not to license technologies under the stronger IPR regime, but rather supply markets with imports at higher prices. An additional costly implication is that technology-supplying firms will have stronger leverage in their bargaining positions as a result of stronger patent and trademark protection, permitting them to negotiate higher licence charges and royalty fees. Thus, developing nations could suffer reduced inward technology flows at higher prices.

66. Again, it should be noted that these negative effects are by no means a certainty. As discussed above, stronger IPRs could expand the profitability of FDI and its implicit technology transfer in many developing countries, particularly in pharmaceuticals and chemicals. Research joint ventures and R&D subsidiaries could become more profitable to foreign firms as local IPRs become better protected and enforced, as noted in Mansfield's 1994 survey. Stronger IPRs could also reduce the costs of technology transfer, which, in addition to local resource costs and infrastructure, depend on the certainty of contract terms and guarantees in the handling of proprietary information (Teece, 1977; Jorde and Teece, 1990; David, 1992). Once again, it follows that countries are more likely to benefit from additional technology transfer under the TRIPS Agreement if they coordinate their stronger IPRs with broader modernization programmes for technology development, including human resource and skills development.

67. In summary, one can say empirically that intellectual property protection is one of a larger number of factors influencing firms' decisions to transfer technology to, or invest in, a particular country. It therefore becomes evident that the effect of strengthened intellectual property protection is often dependent on its interrelation with the effects of other factors, such as the size of the domestic market, the structure of factor supply, produc-

tive infrastructure and the degree of stability of the macroeconomic environment. It is also worth noting that the theory and evidence available to date are based on the existence of different levels of IPRs in various nations. The question remains as to how the effective reconciliation of varying national IPR systems to the TRIPS Agreement's standards will affect the relative positions of countries in their IPR rankings and how this change will influence the global distribution of FDI flows. It is fair to expect that the other determinants of FDI and licensing will take on added importance in the wake of the TRIPS Agreement.

#### *Impacts on competitiveness and growth*

68. The difficulty of making specific claims about the potential impacts of the TRIPS Agreement on prices, production, innovation, technology transfer and diffusion, and FDI is by now clear. In consequence, making predictions about the effects on international competitiveness and growth performance in developing countries is problematic. On the positive side, however, it should be noted that if the TRIPS Agreement induces additional international trade in IPR-sensitive industrial inputs, such trade should embody rising amounts of technology and have a cost-reducing impact that offsets associated price increases. Further, to the extent that stronger IPRs provide greater incentives for additional formal technology transfer through FDI and licensing contracts, there should be a positive growth impact. At least in the long term, the TRIPS Agreement could also have some beneficial impact on domestic innovation programmes. On the negative side, developing countries may experience some increase in prices of imported goods and services, although those price increases may be moderated by market-structure effects. And stronger IPRs will directly slow down technology transfer through legitimate imitation and illegitimate copying.

69. These effects will most certainly vary across countries. Beneficial impacts are most likely in the newly industrializing economies that have developed strong industrial and technological bases that will be increasingly applied to technical innovation. Moreover, the larger developing countries have deeper market structures that will help blunt any anti-competitive results of the TRIPS Agreement.

70. However, in those nations in which technological development is at a rudimentary stage and to which technology transfer and diffusion is modest, with little in the way of offsetting local innovation, there could be net costs, even over the longer term. In improving their position, these countries should take full advantage of technical assistance programmes offered by multilateral organizations and by the firms and Governments of developed economies.

#### **B. Direct costs stemming from the TRIPS Agreement**

71. One primary implication of implementation and enforcement of the rules, disciplines and procedures called for in the TRIPS Agreement will be the direct costs of generating or improving administrative mecha-

nisms. A number of developing countries need to adopt new legislative and judicial instruments, while others must modify their existing systems. The Agreement provides broad guidelines to countries for the elaboration of national standards in the many complex areas of IPRs. It will be an important undertaking to devise these standards and affiliated instruments. In some cases, this will require adequate allocation of specific resources for the adaptation of legislation and institutional structures. In addition, in many countries there is an absence of appropriate means for proper registration and management of IPRs owing to the requisite costs and lack of expertise.

72. Many least developed countries (LDCs) have only rudimentary IPR systems currently in place. In implementing the new intellectual property regimes, LDCs would immediately be confronted with financial and administrative constraints. In terms of a time frame, LDCs would probably need to embark on two stages of adaptation, namely immediate tasks after the general entry into force of the TRIPS Agreement, and tasks to be carried out during the remaining ten-year transitional period. The immediate task would be to comply with the provisions on national treatment and those on most-favoured-nation treatment. Both principles must be incorporated into the LDCs' national legislation.

73. During the transitional period, the tasks would consist of changes in national legislation in accordance with the standards laid down in the TRIPS Agreement, the elaboration of judicial procedures for enforcing law, and the establishment of an administrative framework, including customs procedures. The latter would not only deal with the upgrading of existing arrangements but also with establishing additional administrative arrangements for areas not currently covered by the administrative machinery. Given the type, nature and scope of the legal and institutional changes called for by the provisions of the Agreement, the tasks involved in such adaptation could indeed entail considerable costs for LDCs.

74. For example, many countries will need to decide whether to establish a costly examination system for patent applications or to economize on such costs by recognizing and registering patent grants made by established foreign offices. Trademark registration alone would require the establishment of computerized information networks to facilitate the task of enforcement authorities, including customs officials. It should be noted that these authorities will benefit from the income generated from fees for registration and related formalities which, after the start-up costs, may in some cases generate positive net revenues in the long term. Together with these administrative arrangements, the customs authorities are directed to be active in enforcing border measures consistent with the Agreement. To meet such requirements, customs officials will need a comprehensive monitoring system for both imported and exported goods. Further, authority must be provided to take action against counterfeit goods or parts that are imported for the purpose of assembling or producing a finished product to be sold domestically or exported to a third market. Numerous agencies may be required to cope with such problems. Adherence to the Agreement also imposes requirements for the judicial system to adjudicate civil and criminal procedures in the IPR realm. Such matters

could range from straightforward enforcement actions in counterfeiting to complicated technical questions regarding fair use of copyrighted or patented materials. It is likely that effective enforcement will require that significant resources be devoted to training judges and legal officials in the intricacies of intellectual property protection.

75. Coordination between registration, enforcement and judicial authorities may need to be examined further, especially in developing countries which must enact changes in law and procedures to comply with the obligations contained in the Agreement. Moreover, because technology transfer arrangements tend to be economically and technically complex, it may be important

to develop capabilities to facilitate and monitor the terms of such contracts for purposes of competition maintenance. Each of these substantive areas of responsibility will require considerable training for professional staff.

76. In summary, the administrative requirements with which developing countries must cope include: (a) improving the relevant legal framework in line with the general obligations of the Agreement; (b) strengthening or establishing the relevant administrative offices; (c) enhancing enforcement mechanisms of the relevant laws and regulations; (d) increasing training; and (e) increasing the capability to monitor transfer of technology arrangements within and between enterprises, along with ensuring that competition authorities are knowledgeable about potential IPR abuses.

#### IV. ADOPTING A BALANCED SYSTEM OF IPRs IN ENCOURAGING INNOVATION

77. One important theme of this report is that developing countries should structure their IPR systems, including the implementation of the TRIPS Agreement, in such a way as to enhance dynamic competition consistent with their development objectives. This section briefly reviews the general components of such an approach, while part two discusses the means for implementing the TRIPS Agreement in a manner that promotes competition in the use of IPRs. The main objective of this brief section is to comment on the potential role of the new IPR regime in encouraging innovation and rationalizing national innovation policy.

78. The general goal of national innovation systems is to enhance a country's stock of technical knowledge and know-how, which occurs both through acquisition and learning of foreign technology and the development of institutions and technical capabilities at home. For this purpose, each country has a national innovation system, comprising educational systems for the acquisition of technical and entrepreneurial skills, public and private provision of job training, national science and technology policies, support for basic research, and incentives for applied R & D and commercialization of the fruits of R & D. In the past, the efforts of many developing countries to encourage acquisition and development of innovation have been inadequate and inefficient.<sup>17</sup> It is not the task of this report to analyse these shortcomings, but rather to discuss ways and means of improving innovation systems, with particular reference to the IPR regime and taking into consideration the standards laid down in the TRIPS Agreement.

79. The view that IPRs should be regarded as market-based incentives is controversial. The basic claim is that IPRs simply set the rules within which firms compete for profits from innovation. In this context, considerable efficiency gains may emerge from encouraging firms to innovate, based on their perceptions of market demand and technical progress. Inevitably, however, the rules must strike a balance between incentives to invent and the need for diffusion of knowledge. Countries at different levels of economic development and technological capacities perceive varying interests in setting and enforcing these rules. It is possible to make the IPR system overprotective, leading to strong market positions that raise concerns about effective diffusion, or underprotective in the hope of generating considerable diffusion, through imitation and infringement. However, this approach tends to limit both domestic R & D and access to foreign technologies.

<sup>17</sup> For a review of the literature discussing this issue, see UNCTAD (1996b).

80. By setting minimum global standards for intellectual property protection, the TRIPS Agreement effectively removes from developing countries the ability to choose systems in much of the lower ranges of the protective scale. The standards under which the Agreement is ultimately implemented in the bulk of developing countries could have significant impacts on global innovation and diffusion. Only the passage of time will reveal these impacts, and much will depend on related trends in the world economy.

81. However, it is interesting to speculate at this stage on some potential impacts of the TRIPS Agreement on these processes. Existing theoretical treatments strongly assume that the Agreement will engineer a full equalization of standards at levels of the industrialized countries (Helpman, 1993 and Glass and Saggi, 1995). Moreover, innovative firms have no incentive to transfer technology; rather, diffusion is strictly a function of imitation activities. With these assumptions, and under constant returns to innovation activities, the theoretical effects of IPR equalization are discouraging. Diffusion of knowledge to developing economies falls because they have diminished legal scope for engaging in imitation and adaptation. This effect reduces competitive pressure on firms in the industrialized countries to innovate, resulting in a global slowdown of knowledge creation. However, these results depend critically on the assumptions mentioned. For example, the TRIPS Agreement does not force developing countries to fully adopt the highly protective standards of the more industrialized countries. More accurate models (as yet undeveloped) would consider the effects of a rise in the average global level and a reduction in the international variance of IPRs, with varying returns to innovation, incentives for technology transfer, and concomitant changes in the application of competition rules. In such models it should be possible to support rising incentives for global innovation, while impacts on diffusion would depend on profit-maximizing FDI and technology transfer in addition to legitimate imitation. Further, some of the new innovations should occur in the developing countries, depending on their underlying capacities for doing so and the demands perceived.

82. The standard innovation-diffusion paradigm in which one group of countries (the developed economies) produces new technologies and products and another group of countries (the developing economies) import these and attempt to learn them through imitation is misleading in some dimensions. In particular, the developing economies are not a monolithic group of passive technology importers.<sup>18</sup> Some countries, such as the

<sup>18</sup> Neither are the developed economies of a single mind on IPRs in the aftermath of the TRIPS Agreement.

Republic of Korea and Singapore, have successfully established substantial innovative capacities and are becoming notable exporters of new products and FDI.<sup>19</sup> Others, such as Malaysia and Mexico, are moving in this direction as their technological capabilities and skills expand. As is well known, India has become a major centre for the production and export of software, although most programmes are written under contract to foreign firms. Be that as it may, in recent years, software exports from India, consisting mainly of software services, have expanded rapidly, outstripping the domestic market.<sup>20</sup> The least developed countries, on the other hand, retain limited abilities to innovate (and even to imitate) and have little effective access to new technologies.

83. In this context, developing countries perceive different interests in the implementation and operation of the TRIPS Agreement, which requires them to reconcile their economic development goals with the Agreement's intellectual property norms. For some countries, the Agreement will impose little in the way of new obligations, and the strengthening of global standards could foretell beneficial growth impacts. For others, the Agreement requires substantial changes in norms of protection. Furthermore, in practice, any particular nation's approach to compliance with the Agreement will depend on its own innovation strategy and technology development policies. In any case, there remains scope for countries to implement the Agreement in a manner conducive to promoting dynamic competition within their own economies. In brief, such an approach would involve: (a) establishing IPR laws that are consistent with the TRIPS Agreement but do not significantly disadvantage follow-on inventors and creators; (b) instituting incentive structures that will help stimulate innovation at the local level; (c) taking greater advantage of access to scientific and technical information that resides within the global information infrastructure; (d) applying coherent competition policies to curb the adverse effects of abusive use of IPRs; and (e) improving the innovation system through broader programmes of intellectual skill acquisition and improvement of capacities to absorb new technical information.

84. The importance of elaborating policies to stimulate local inventions in developing countries, which are mostly small or follow-on innovations that may not meet patent eligibility criteria or that firms may prefer to exploit with lead-time advantages rather than incurring the costs of obtaining a patent, is developed in part two. At this point, however, it should be noted that patents taken out in developed countries overwhelmingly cover high-technology products and processes. For example, as detailed in table 2, over 70 per cent of the patents applied for in Europe in 1995 were in instruments, electrical products, chemicals, medicines and transport equipment. These are areas of technology in which most developing countries, and nearly all LDCs, are at present ill-

equipped to compete for global technological leadership. Rather, they are areas in which new technologies will probably need to be licensed from abroad through contracting and FDI. However, this leaves many areas of sectoral production in which follow-on innovation and subpatentable innovation may be fruitfully pursued by developing countries with a view to building a domestic innovative capacity.

85. Clearly, this general analysis disguises many specific and complicated issues in the IPR area. For example, attitudes towards modes of innovation and means of rewarding creative activity may vary across industrial sectors. In many developing countries, a key area for research has been agriculture. The TRIPS Agreement calls for some changes in policies, such as extension of patent coverage to microbiological processes and the provision of *sui generis* rights for plant varieties, that will affect national agricultural research programmes. If developing countries insist on performing such research in public laboratories, their budgets must be prepared to absorb any rises in costs associated with stronger IPRs. Private investment in some research programmes could bear potential for improving their efficiency and promoting joint ventures with foreign firms, with a view to expanding access to new agricultural technologies and encouraging greater follow-on innovation. In the long run, this strategy could help to moderate costs for farmers using the new plant varieties and seeds.<sup>21</sup>

86. In conclusion, it is important to recognize that strengthening the IPR system alone, while bearing some potential for expanding access to trade, FDI and technology, is liable to be of little value unless done in a coherent framework of broader policies. Most of these policies were implicit in the earlier analysis. For example, countries that fear the monopolization effects of stronger patents can help ensure effective competition through the liberalization of commercial policies and pursuit of appropriate competition policies. Countries that are hopeful of attracting more technology would do well to focus energies on improving skill acquisition through education and training. The university system itself could become a stronger provider of new technical information that would be commercialized under appropriate incentives and well formulated relationships among the academic and private sectors. It is also important to work towards ensuring that fair contracts will be upheld, while regulatory policies regarding joint ventures and mergers need careful consideration. In short, IPRs should be implemented in such a way as to promote dynamic competition through the acquisition and local development of technology in an environment that is conducive to growth. In such an environment, stronger IPRs should themselves become a spur to additional growth; otherwise they might result in higher prices and limited growth.

<sup>19</sup> See, for example, Wong Poh Kam (1995); Bowonder and Miyake (1988).

<sup>20</sup> See *Financial Times*, 3 July 1996.

<sup>21</sup> An analysis of the implications of IPRs and plant varieties for plant breeders is presented in part two. See also annex 2 for a discussion on successful cases of plant breeders' protection in five Latin American countries.

## V. CASE-STUDIES CARRIED OUT IN SELECTED COUNTRIES

87. To gain some perspective on the above issues, the UNCTAD secretariat invited local experts in six developing countries to analyse expected implementation problems in their own countries. The objective is not to compare countries, but to review, in a preliminary way, the existing state of IPR regimes in countries at different levels of development and assess possible obstacles in the implementation of the TRIPS Agreement. As shown below, the responses indicate a wide disparity in the requirements for implementing the Agreement and in the expected costs, which are particularly large in the LDCs. Summaries of the experts' submissions are presented below.

### Chile<sup>22</sup>

88. Chile enacted a new industrial property law in 1991 and also acceded to the Paris Convention in that year. Prior exclusions from patentability of certain fields of technology were eliminated by the new law. Adjustments remain to be made and are under consideration, including the duration of protection and reversal of the burden of proof in cases of patent process infringement. Chile is a long-time member of the Berne Convention. Since its last revision in 1992, the copyright law meets most of the TRIPS Agreement standards, although clarifications are required in the areas of database protection, rental rights, and performers' rights. There is no *sui generis* law protecting computer chips, but these are eligible for patent protection if they meet Chilean patentability criteria. Chile is a member of the International Union for the Protection of New Varieties of Plants (UPOV) and therefore is committed to providing plant breeders' rights. The country also provides mechanisms for enforcing IPRs, while it has an articulated competition policy that incorporates judicial oversight of the abuse of intellectual property. The TRIPS Agreement will not be fully in force in Chile until 1 January 2000.

89. Since the passage of the new industrial property law in 1991, the industrial property department has seen a significant rise in both domestic and foreign applications for patents and trademarks. However, the number of grantings, especially of patents, has fallen because the rising technical complexity of patent claims has begun to overwhelm the patent examiners. Partly reflecting this fact, in 1995 the fee revenues for industrial property, amounting to \$6 million, outstripped the \$1 million budget of the department. Chile has seen a rapid expansion

in inward FDI in recent years.<sup>23</sup> It is impossible to know how much, if any, of this increase is due to stronger IPRs and how much is due to other determinants of investment such as economic growth and demand expansion.

90. Chile has begun a modernization programme involving the drafting of administrative procedures, training of judges, industrial property professionals and copyright officials, and upgrading customs enforcement. The expert's analysis predicts that this programme will involve perhaps \$718,000 in one-time costs for drafting adjustments in laws and enforcement procedures and initial training of judges and professional staff. It will require \$837,000 in additional annual costs for recurrent training, hiring of new personnel and upgrading registration and examination systems. However, much of these costs simply reflect Chile's need to cope with rising demands on its IPR system, only part of which will be related to the effects of the TRIPS Agreement. Indeed, Chile anticipates continued rapid increases in trademark and patent applications, given its strong growth prospects, rising innovation capacity and burgeoning consumption spending. In turn, it is estimated that Chile's fee income in industrial property operations will rise to \$9 million by the year 2001.

### Egypt<sup>24</sup>

92. The expert submission from Egypt did not assess the state of existing Egyptian IPRs relative to the TRIPS Agreement's standards. However, shortcomings may exist, as evidenced by the fact that Egypt does not provide protection for pharmaceutical patents. Thus, a review of required legislative and administrative changes is under way. Enforcement mechanisms already exist in Egypt, including police raids to seize illegal copies of copyrighted goods and to confiscate equipment used in producing the copies. Customs control is available but only upon request of private interests, and customs authorities are not equipped to undertake monitoring and discovery activities without prior notification.

92. Egypt is considering its needs for upgrading the IPR system. Estimates suggest that an increase in patent personnel and new equipment will cost \$598,000. Strengthening the judiciary framework will cost \$192,000. Finally, strengthening the scope of customs

<sup>22</sup> Submission by Sergio Escudero, "Implications of adapting national intellectual property rights laws and institutional arrangements to the TRIPS Provisions: Case-Study of Chile" (1996).

<sup>23</sup> See UNCTAD (1995c), p. 393.

<sup>24</sup> Submission of M. Osama El Magdoub, "Cost of adapting national IPR laws and institutional arrangements to the TRIPS provisions" (1996).

authorities and training their personnel is expected to cost \$1 million.<sup>25</sup> Egypt has an urgent need for training in virtually all IPR fields and for human resource development. Accordingly, Egypt is asking for technical assistance and advice in the areas of amending laws and regulations, upgrading judicial and administrative frameworks, building human-resource capacity, collecting and disseminating technical information about IPRs, and strengthening negotiating capacities for technology acquisition.

### India<sup>26</sup>

93. In India, patents are protected under the Patent Act 1970, which excludes plants and animals from eligibility and provides only process patents for food products, drugs and chemical inventions. Patents last 14 years from the date of application. However, for foods, medicines and chemicals they last seven years from the date of filing of the complete specification and, moreover, these patents come under compulsory licences after three years. Thus, new legislation, whenever it is enacted during the transition period, will require significant lengthening of patent periods and strengthening of the scope of coverage. Furthermore, provisions for the reversal of burden of proof in process infringement cases will be required. Legal modifications will also be required for industrial designs and trademarks. Plant varieties are not protected, while there is debate over whether biotechnological inventions are eligible for patents. Nor is there protection for integrated circuits. There is also no *sui generis* law for the protection of geographical indications. The staff of the offices administering industrial property are small and not sufficiently well equipped. The evidence obtained indicates that the revenue of the Patent Office in the period 1993-1994 was \$224,000, while expenditures were \$562,000 (at end-1995 exchange rates). Revenue of the Trademark Office was \$620,000 and expenditures were \$574,000.

94. India has long had strong copyright protection for traditional forms of literary and artistic endeavour. The Copyright Act of 1957 was last revised in 1994, and India is a member of the Berne Convention, the Universal Copyright Convention<sup>27</sup> and the Geneva Convention for Producers of Phonograms.<sup>28</sup> Protection in India is for the life of the author plus 60 years; it is 60 years for photographs, films and sound recordings. India allows for fair-use exemptions under the terms of the Berne Convention. Broadcast protection and rental rights are recognized in the law. Finally, computer programmes are copyrighted under terms allowing reverse engineering. Overall, India's copyright system is up to most TRIPS Agreement standards.

<sup>25</sup> These estimates reflect cumulative costs.

<sup>26</sup> Submission by C. Niranjan Rao, "Implications of adapting national intellectual property rights laws and institutional arrangements to the TRIPS provisions: a case-study of India" (1996).

<sup>27</sup> See Universal Copyright Convention, as revised in Paris on 24 July 1971.

<sup>28</sup> See Convention for the Protection of Producers of Phonograms against Unauthorized Duplication of their Phonograms, Phonograms Convention (Geneva, 1971).

95. India's laws concerning border enforcement appear to be up to the requirements of the TRIPS Agreement. Infringement activities through production and imports are prohibited, and customs authorities are empowered to prevent imports that infringe copyrights and trademarks. In this connection, India plans no expansion of its enforcement personnel or mechanisms but is staging a few training seminars for judges and customs officials on the details of IPRs.

96. To date, India has not yet modified its Patents Act. An ordinance was promulgated on 31 December 1994 to amend the Patents Act 1970 to provide a means for acceptance of product patent applications and to provide for "exclusive marketing rights" (EMRs) for pharmaceuticals and agricultural chemical products from 1 January 1995. Nevertheless, the bill introduced to the Legislature in 1995 to ratify this ordinance was passed by the Lower House (Lok Sabha) but failed to pass the Upper House (Rajya Sabha), which is currently studying the draft law. Nevertheless, since 1 January 1995 the Patent Office has been accepting applications for product patents in pharmaceutical and agro-chemical inventions.<sup>29</sup> Regarding trademarks, a new bill was introduced to provide protection for service marks and "well-known" marks. This law has also been stalled in the legislature, and indications are that India will use the full transition period before implementing such changes. India is intending to develop new laws protecting plant varieties and integrated circuits and may opt for a *sui generis* law on geographical indications within the next three years.

97. Given this background, it seems that India's main implementation costs will arise from drafting legislative changes and especially from improving facilities in the industrial property administration. Several commentators have noted the urgent need for modernization of the Patent Office, which saw a sharp rise in patent applications in early 1995. Patent examiners perform manual searches of prior art because of limited access to computers and international databases. There is a growing backlog of unprocessed applications, while the number of applications is expected to rise from 7,000 in 1995 to 10,000 in 1998. Accordingly, the Patent Office is attempting a modernization programme involving human resource development, computerization, training and infrastructural improvement. A three-year project is being drafted and is expected to cost \$5.9 million, with technical assistance from WIPO and financial assistance from UNDP, in addition to Indian Government funding. Patent offices are needed in India's state capitals or commercial centres to accept applications and disseminate information about patents. Linking the patent offices in major cities through the National Informatics Centre Network (NICNET) with a computerized Patent Information System in Nagpur has been successful. Regarding trademarks, India recently completed a three-year project to modernize its administrative system. The project, which cost \$353,000, was jointly funded by UNDP and the Indian Government. No predictions have been made about the anticipated costs of further modernization or the implementation of registration and examination procedures in the new areas of IPRs.

<sup>29</sup> See discussion on patents in Part Two.

### Malaysia<sup>30</sup>

98. Malaysia is continuously reviewing and strengthening its intellectual property laws in line with the growing sophistication of its industrial sector. Manufacturing now constitutes more than 30 per cent of its GDP. In addition to the Patent Act and Copyright Act, Malaysia is introducing the Industrial Design Act in 1997 which will provide for the registration of all designs. It was the Government's objective through this Act to facilitate the development of Malaysian-made goods with unique features and designs. With regard to the TRIPS Agreement, several working groups have been established. These groups comprise experts from public and private sectors to study the various aspects of the Agreement and its implementation processes. It is felt that an adequate intellectual property system is critical to support the increasing needs of Malaysian industry to be more innovative and competitive in today's world. The Government is also investing in modernizing the patent administration system. The Intellectual Property Division of the Ministry of Trade and Consumer Affairs will be fully computerized, so as to facilitate trademark and patent searching. It will make use of the "Common Software", an application software for administration and management of trade and patents developed by the European Patent Office.

99. Malaysia has established a special enforcement team within the Ministry of Domestic Trade and Consumer Affairs to apprehend and prosecute copyright infringers. A total of 450 officers within the 35 enforcement branches all over the country are devoted to the application of provisions of the copyrights law.

### Bangladesh<sup>31</sup>

100. In relation to the TRIPS Agreement standards, Bangladesh is taking steps to implement the immediate obligations of the TRIPS Agreement and is also beginning its deliberations on passing legal and administrative mechanisms for the substantive requirements during the transition period. Regarding the latter, Bangladesh may need to introduce modifications to its existing IPR regimes.

101. Patents, designs and trademarks are protected under previous industrial property laws, which were last revised in 1985. Technical administration of industrial property is spread across two ministries, and professional and support staff are small and inadequately trained. Bangladesh needs to pass new legislation in areas that are currently not covered, including patents for food products and pharmaceuticals, and patents or special protection for plant varieties. The terms of patent and design protection need to be extended, while trademark renewals require attention as well. Bangladesh's

<sup>30</sup> Submission by Hamzah Kassim, "Intellectual property system in Malaysia" (1996).

<sup>31</sup> Submission by Nurun N. Rahman, "Implications of adapting national intellectual property rights laws and institutional arrangements to the TRIPS Agreement of the Uruguay Round: A diagnostic study on Bangladesh" (1996).

limited technological basis, low levels of commercialization and industrialization and minimal awareness among the public of the nature of IPRs explain the small volume of patent, design and trademark applications and grants.

102. Traditional copyrights have long been protected, although the monetary fine for infringement is small. Copyrights for computer programmes do not exist, and a new law needs to be drafted. Further, judicial, local and border enforcement procedures for IPRs need to be devised largely *de novo*. The country also needs to assemble an effective administrative framework for IPRs.

103. It is estimated that, in order to comply with the TRIPS Agreement over the transition period, Bangladesh will need to spend \$250,000 in one-time costs for legislative drafting and over \$1.1 million in annual costs for judicial work, equipment and enforcement measures. This latter sum does not include the costs of training, which are likely to be substantial, and which suggest a pressing need for foreign assistance. Indeed, the author of the case-study called for two types of work in this regard. First, it would be useful to perform an in-depth study of Bangladesh's needs, including identification of precise changes required in legal and administrative mechanisms and how to specify new procedures in such a way as to ensure competition on the national market. The study should also consider how to create a sound technological base in Bangladesh. Second, the country would need considerable financial assistance and technical advice in implementing the Agreement and defraying its costs, developing legislative strategies, providing training seminars and workshops, building technical capacities in industry, disseminating information on IPRs, and strengthening negotiating capabilities for technology transfer.

### United Republic of Tanzania<sup>32</sup>

104. Currently, the United Republic of Tanzania has laws covering patents, trademarks, service marks and copyrights. It is also expected that a law on trade secrets will come into operation in 1996 or 1997. There are no laws covering geographical indications, integrated circuits or plant varieties, and it is unclear whether software is protected. Administrative offices are small and need both expansion and modernization. There is no systematic arrangement to enforce intellectual property laws. No specialized enforcement units exist, and border controls are ineffective because customs officials are untrained in IPRs. Judges are generally not strongly aware of the requirements of IPRs. It is interesting to note, however, that in recent years, local musicians have begun to agitate for stronger enforcement of their copyrights, since their works have been subject to piracy.

105. The United Republic of Tanzania is likely to avail itself of the full transition period because of the substantial requirements for change and modernization it

<sup>32</sup> Submission by S. M. Wangwe, S. Mjasiri, and G. Robi, "Cost of adapting national IPR laws and institutional arrangements to the TRIPS Agreement: The case of Tanzania" (1996).

faces. Legislative changes, establishment and strengthening of administrative offices, expanding enforcement capabilities and providing training are estimated to cost between \$1 million and \$1.5 million.<sup>33</sup>

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106. From the above summaries of case-studies, at least three clear points emerge. First, the implementation of the TRIPS Agreement in developing countries would involve changes in existing IPR regimes, the extent and scope depending on, among other things, the level of development of current laws and regulations. Second, the strengthening of intellectual property protection would require the allocation of a relatively (and often absolutely) larger amount of resources in the case of the

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<sup>33</sup> There is considerable uncertainty in assembling estimates of this nature.

LDCs in order to achieve the goals set out in the TRIPS Agreement. In recognition of this special burden, the particular needs and requirements of LDCs have been taken into account in the transitional period accorded to them in respect of the application of the Agreement. The Agreement acknowledges the need for flexibility in order to create a viable technological base and calls on developed countries to "provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer" in order to enable LDCs "to create a sound and viable technological base" (Article 66.2). However, how such incentives will be provided by developed countries is not clear and requires further study. Finally, the findings of the case-studies help to illustrate the urgent need for better understanding by some developing countries of the options available and the conditions necessary for a full and balanced implementation of the TRIPS Agreement. This is discussed in part two of the study. It requires concerted efforts by both Governments and international organizations in building awareness of the obligations stipulated in the Agreement and the importance of implementing the standards laid down in a manner that enhances dynamic competition.

*Part Two*

**The TRIPS Agreement  
and its specific applications**

## I. INTRODUCTION

107. Part Two will review the implications of the main areas of IPR standards covered under the TRIPS Agreement that are of primary interest to developing countries and will discuss ways and means of implementing these standards in a manner that enhances the competitive capabilities of implementing countries. It will also examine the relationships between competition issues and IPRs within the TRIPS Agreement framework. The analysis of the applications of the specific disciplines is organized under four broad subheadings, namely: the relevant TRIPS Agreement standards; their main implications for developing countries; the mode of their implementation; and the potential cost of such implementation. However, the analysis of competition issues (see section VIII below) will take a different format owing to its different treatment in the TRIPS Agreement and the nature of the subject-matter.

108. The international standards set out in the TRIPS Agreement vary considerably in their technically legal character. At one extreme, some standards are relatively detailed and require a precise mode of implementation. This occurs in the case of trademarks, for example, because the new standards build on a fully elaborated, pre-existing foundation in international intellectual property law. At the opposite extreme, other standards introduce an abstract legal concept or principle on which there is some general understanding but little harmonization or consensus in actual state practice. This frequently occurs even with regard to such traditional objects of protection as patentable inventions and copyrightable literary and artistic works. In such cases, member countries will have a range of policy options from which to choose when translating specific intellectual property norms into domestic law and practice, and how they exercise these options may significantly determine

the overall implications of the TRIPS Agreement for these countries.

109. In selecting from among these options, policy-makers should bear in mind that intellectual property systems represent a dynamic balance between incentives to create and the public interest in competition.<sup>34</sup> When a given policy option tends to lower the level of protection in any given subject-matter category, it necessarily enlarges the public domain from which competitors may draw while lessening the incentives to innovate. In each case, single countries must therefore determine the balance to be struck that best reconciles the needs of their national innovation system with good-faith implementation of the TRIPS Agreement.

110. In this connection, policy-makers will often find that the heaviest constraints on the range of options formally available stem less from international standards than from such development goals as the encouragement of FDI, transfer of technology and the stimulation of local innovation, given the requirements of national treatment under the TRIPS Agreement. In other words, countries must take the needs of local innovators into account when determining the level of protection to be afforded under their reformed intellectual property systems. A further constraint on intellectual property policy-making in the developing countries is the cost of training skilled personnel and of maintaining the autonomous administrative capabilities to implement refined legal doctrine on a case-by-case approach.

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<sup>34</sup> See, in this context, United States Supreme Court decisions such as *Bonito Boats, Inc., v. Thunder Craft Boats, Inc.*, 489 U.S. 141 (1989); *Compco Corp. v. Day-Brite Lighting, Inc.*, 376 U.S. 234 (1964); *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225 (1964).

## II. PATENTS

### A. Relevant TRIPS Agreement standards

111. The TRIPS Agreement (Section 5, Part II) contains standards relating to patents and covers both substantive standards as well as specific issues of enforcement that are generally applicable to patents. The following provisions are noteworthy:

- (a) Member States may not exclude any field of technology from patentability as a whole, and they may not discriminate as to the place of invention when rights are granted (Article 27);
- (b) The domestic patent laws must provide a minimum term of 20 years of protection from the filing date. Such protection must depend on uniform conditions of eligibility, and specified exclusive rights must be granted (Article 33);
- (c) The patentees' bundle of exclusive rights must include the right to supply the market with imports of the patented products (Article 28);<sup>35</sup>
- (d) Compulsory licences remain available and can be granted under the existing law of the Member country, subject to the detailed conditions set forth in the Agreement (Article 31).

112. These provisions build on standards previously established by the Paris Convention,<sup>36</sup> such as the rights of priority, which even WTO members who do not adhere to this Convention must now respect. Single countries may deviate from these universal patent-law standards only to the extent that they make use of transitional periods, which vary with the beneficiary's status as either a "developing country" or a "least developed country" (for details on the transitional arrangements, see table 3). For example, developing countries may postpone implementing most of the required standards for a period of five years (Article 65). LDCs obtain a reprieve for 11 years, while proof of hardship may qualify them for further delays and other concessions (Article 66).<sup>37</sup>

113. The provisions on enforcement (Part III of the Agreement) are generally applicable to patent rights, although Member countries need not apply the special re-

quirements of border control measures to patents. Such measures are obligatory for trademarks and copyrights.

114. In addition, the Agreement (Articles 70.8 and 70.9) describes the procedures to be followed if a Member country applies the transitional periods provided for under Article 65 of the Agreement to pharmaceutical products and agro-chemicals. This provision allows developing countries to delay the recognition of pharmaceutical patents for up to 10 years from the date of entry into force of the TRIPS Agreement. This term is extended to 11 years for least developed countries (Article 66). The transitional periods are automatically applicable, i.e. there is no need for prior notification or declaration by concerned Member countries. However, Members that apply the extended period of 10 years for pharmaceutical or agrochemicals are bound to accept the filing of new applications for pharmaceutical product patents during that period, and they are further bound eventually to grant "exclusive marketing rights" (EMRs) for a limited period (Article 70.9).<sup>38</sup>

### B. Main implications

115. Of all the measures contained in the TRIPS Agreement, the patent provisions may be the most significant in terms of economic implications for developing countries. This follows from the growing importance of patents in major industrial sectors, particularly in R & D-intensive sectors (see table 2), from the number and breadth of the patent provisions that are covered and from the differences in the scope and extent of protection that will now have to be afforded by both developed and developing countries, as compared with prior law.

116. The major impact of the Agreement will be felt in cases where patent protection needs to be extended (after the transitional period) to new subject-matter areas, such as pharmaceuticals, agrochemicals, beverages and food. Important economic effects may also arise from the obligation to extend the time of protection (20 years from application). At the start of the Uruguay Round, about 50 countries did not grant protection to pharmaceutical products at all, and some excluded pharmaceutical processes from protection as well. There are still some developing countries that do not confer any protection on pharmaceutical products.<sup>39</sup>

117. Many studies have been conducted on the general implications of introducing or reinforcing intellec-

<sup>35</sup> According to a footnote to Article 28 (a) of the Agreement, this might be subject to the provisions of Article 6 dealing with exhaustion of rights.

<sup>36</sup> Paris Convention for the Protection of Industrial Property, Stockholm Act of 14 July 1967.

<sup>37</sup> See also WTO Agreement, Article XI (2), requiring LDCs "only ... to undertake commitments and concessions to the extent consistent with the individual development, financial and trade needs or their administrative and institutional capabilities".

<sup>38</sup> For details, see table 1 above.

<sup>39</sup> There are about 25 countries where pharmaceutical products are still excluded from patent protection.

TABLE 2

## Technological trends as reflected in European and Euro-PCT patent applications

| Sectors ranked according to the number of applications filed in 1995<br>(by International Patent Classification (IPC) Sections/Subsections) | Percentage share (%) of sector and its rank (R) among all sectors |   |        |   |        |   |        |   |        |   |        |   |        |   |
|---|---|---|--------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
|   | 1995  |   | 1994   |   | 1992   |   | 1990   |   | 1988   |   | 1985   |   | 1981   |   |
|   | %   | R | %      | R | %      | R | %      | R | %      | R | %      | R | %      | R |
| Instruments .....   | 16.92   | 1 | 17.3   | 1 | 18.1   | 1 | 17.7   | 1 | 16.5   | 1 | 15.9   | 2 | 14.0   | 2 |
| Electricity .....   | 16.85   | 2 | 16.8   | 2 | 15.8   | 2 | 15.1   | 2 | 13.8   | 3 | 14.1   | 3 | 13.2   | 3 |
| Chemistry .....   | 13.67   | 3 | 13.4   | 3 | 14.4   | 3 | 14.9   | 3 | 15.9   | 2 | 17.3   | 1 | 20.4   | 1 |
| Health and amusement ...  | 9.00  | 4 | 8.8    | 4 | 7.7    | 5 | 7.4    | 5 | 7.5    | 5 | 5.7    | 6 | 4.8    | 6 |
| Transporting .....  | 8.11  | 5 | 8.1    | 5 | 7.9    | 4 | 8.0    | 4 | 8.3    | 4 | 7.4    | 4 | 7.7    | 4 |
| Building and engineering  | 6.19  | 6 | 6.1    | 6 | 5.7    | 6 | 6.2    | 6 | 6.4    | 6 | 6.7    | 5 | 7.2    | 5 |
| Agriculture, foodstuffs, etc.   | 2.28  | 7 | 2.3    | 7 | 2.3    | 7 | 2.4    | 7 | 2.4    | 7 | 2.5    | 7 | 2.6    | 8 |
| Lighting and heating .....  | 2.14  | 8 | 2.1    | 8 | 2.1    | 8 | 1.9    | 8 | 2.0    | 8 | 2.3    | 8 | 3.1    | 7 |
| Subtotal for 8 sectors above .....  | 75.16   |   | 74.9   |   | 74.0   |   | 73.6   |   | 72.8   |   | 71.9   |   | 73.0   |   |
| Other Sections/Subsections .....  | 24.84   |   | 25.1   |   | 26.0   |   | 26.4   |   | 27.2   |   | 28.1   |   | 27.0   |   |
| Total number of applications (= 100.00 per cent) .....  | 60 078  |   | 57 815 |   | 58 895 |   | 62 778 |   | 52 312 |   | 33 748 |   | 22 428 |   |

Source: UNCTAD secretariat analysis based on data from European Patent Office, *Annual Report 1981* (table 2.5), 1985 (table 2.5), 1988 (table 1.4), 1990 (table 1.4), 1992 (table 2.3) and 1995 (table 2.3).

NOTE: The eight sectors given above are composed of the following classes of the International Patent Classification:

**Instruments:** Measuring, etc. (G01), optics (G02), photography, etc. (G03), horology (G04), controlling, etc. (G05), computing, etc. (G06), checking devices (G07), signalling (G08), educating, etc. (G09), musical instruments, etc. (G10), information storage (G11), instrument details (G12).

**Electricity:** Basic electric elements (H01), generation, conversion or distribution of electric power (H02), electric techniques (H05), basic electric circuitry (H03), electric communication technique (H04).

**Chemistry:** Organic chemistry (C07), preservation of bodies, etc. (A01N), organic macromolecular compounds, etc. (C08), dyes, etc. (C09), petroleum, etc. (C10), animal or vegetable oils, etc. (C11), biochemistry, etc. (C12), sugar (C13), skins, etc. (C14).

**Health and amusement:** Medical and veterinary science, hygiene (A61), life saving, fire fighting (A62), sports, games, amusements (A63), preparations for medical, dental or toilet purposes (A61K).

tual property protection in developing countries (see part one). Particular concerns have been expressed with regard to the availability and pricing of medicines after product patents are introduced in compliance with the TRIPS Agreement (see annex 1). However, any generalization about the economic implications of introducing patent protection for pharmaceuticals (or other areas) would probably be premature. For example, the impact of the introduction of pharmaceutical patents in specific cases will vary significantly with a number of factors, such as: (i) the length of the transitional period applied by a particular member country; (ii) the date of granting and the scope of the EMRs eventually conferred; (iii) the conditions under which patents are granted and, particularly, the availability of compulsory licences, and the way in which competition law is applied; and (iv) the share of the market attributable to patented products, their price elasticity, the substitutability of products, differences between the market structure pre-TRIPS and post-TRIPS, the eventual existence of price controls, the significance of local production of pharmaceuticals, and the size and technological capabilities of local firms.

**Transporting:** Vehicles in general (B60), railways (B61), land vehicles for travelling otherwise than on rails (B62), ships or other waterborne vessels and related equipment (B63), aircraft, aviation, cosmonautics (B64), conveying, packing, storing, handling thin or filamentary material (B65), hoisting, lifting, hauling (B66), opening or closing bottles, jars or similar containers; liquid handling (B67), saddlery, upholstery (B68).

**Building and engineering in general:** Construction of roads, railways or bridges (E01), hydraulic engineering, foundations, soil-shifting (E02), water supply, sewerage (E03), building (E04), locks, keys, window or door fittings, safes (E05), doors, windows, shutters or roller blinds in general, ladders (E06), engineering elements or units, etc. (F16), storing or distributing gases or liquids (F17).

**Agriculture, foodstuffs and tobacco:** Agriculture, forestry, animal husbandry, hunting, trapping, fishing (A01); baking, edible doughs (A21), butchering, meat treatment, processing poultry or fish (A22), foods or foodstuffs, etc. (A23), tobacco, cigars, cigarettes, smokers' requisites (A24).

**Lighting and heating:** Lighting (F21), steam generation (F22), combustion apparatus and processes (F23), heating, ranges, ventilating (F24), refrigeration or cooling, combined heating and refrigeration systems, heat pumps systems, manufacture or storage of ice, liquefaction or solidification of gases (F25), drying (F26), furnaces, kilns, oven, retorts (F27), heat exchange in general (F28).

118. How the transitional period and the granting of EMRs are implemented are also important.<sup>40</sup> Ultimately, the extended period of patent protection and the strengthened exclusive rights will limit the scope for early legitimate imitation by local firms. As a result, when a given invention finally enters the public domain, the technology may already have been superseded by other protected technologies. However, local inventors will also obtain a longer period in which to recover their investments, although the aggregate amount of such investments will normally fall well below that in developed countries.

119. Given the lack of reliable empirical data, predictions about the likely economic effects of the patent provisions tend to vary with the general outlook of the investigators. Some tend to emphasize the likelihood of increased royalty payments to foreign innovators; the

<sup>40</sup> The issue of "exclusive marketing rights", particularly its nature and scope, is not fully covered in this report. Its relevance in the context of the implementation of the TRIPS Agreement merits further investigation.

corresponding loss of investment opportunities in domestic research and development; higher prices for consumer products subject to monopoly rights; and greater dependence on imports in general. Taking the bleakest view, a developing country stands to gain only when a foreign invention affords solutions of particular local utility that would not otherwise obtain sufficient investment in R & D.

120. Others contend that these predictions capture only the static dimension of a worldwide economic adjustment that could evolve in far more positive directions. Instead, they argue that because of the universal patent standards, there will be more and better innovation worldwide and that this will stimulate economic activity even in those countries that account for fewer technical breakthroughs in the short or medium term. This follows in part because "industries can adopt efficient industrial structures without being affected to any considerable degree by the need to encourage innovation" and in part because even when local firms fail to invent around a superior product, a licensing transaction should "benefit . . . both the patentee and the second inventor" (Adelman and Baldia, 1996, p. 509). Moreover even though local consumers pay more for patented products, they and local firms also benefit both from the new products that arose in response to these incentives and also "from products that are off-patent, but which may not have been developed in the absence of a patent system." (Adelman and Baldia, 1996, p. 510).

121. This group also stresses that free-riding on foreign technology can weaken local enterprise, and that this in itself tends to induce a certain dependence as, for example, the dependence of local pharmaceutical industries on foreign R & D. In this view, to the extent that a stronger patent system induces more local R & D devoted to special needs of developing countries that are not felt in the technology-exporting countries, it will eventually reduce the dependence of these countries on foreign suppliers of technology. This, of course, begs the question of how to acquire the basic innovation infrastructure and relevant technical skills to meet the challenge of stronger patent protection. To some extent, this raises a number of problems that can be solved when a sufficient level of per capita income has been attained (Soete in UNCTAD, 1990b).

122. On balance, it seems fair to say that, at least from the medium- and long-term perspective, the economic effects of the patent provisions depend largely on the levels of development of countries and sectors concerned, the speed, nature and cost of innovation, and the measures that developing countries may take in adopting the new framework.<sup>41</sup> To the extent that enhanced market access flowing from the Uruguay Round's Final Act eventually creates new economic opportunities, the additional income may be applied to partly compensate the social costs and to support the strengthening of national innovation systems.<sup>42</sup>

<sup>41</sup> For a comprehensive literature review on these issues, see Siebeck (1990).

<sup>42</sup> See earlier discussion on this question in Part One above.

## C. Implementation

123. Even though implementation of the TRIPS Agreement standards will tend to promote a great deal of uniformity in many areas of patent law, the Agreement does not seek to achieve (nor is its implementation likely to produce) a global harmonization of domestic patent laws. Although the Agreement's standards are objectively high when compared to those under prior international law, member countries are not obliged to implement in their law more extensive protection than is required by the Agreement.<sup>43</sup> In this respect, there is a wide range of options that the Agreement leaves for implementation at the national level, even if the exercise of these options must remain consistent with the express requirements of the Agreement and must not constitute "nonviolatory acts of nullification and impairment".

124. On the whole, studies show that the Agreement leaves developing countries some room in which to adopt national policies that favour the public interest in competition, the encouragement of FDI, transfer of technology and the stimulation of local innovation (Reichman, 1995b). It also recognizes the traditional "public interest" exception and the doctrine of misuse or "abuse". Beyond these doctrines, the TRIPS Agreement introduces new and potentially more expansive concepts as a general framework for the protection of IPRs. In particular, Article 7 stresses the "promotion of technological innovation and . . . the transfer and dissemination of technology . . . in a manner conducive to social and economic welfare". Article 8.1 expands the public-interest criterion to sectors other than public health and nutrition that are "of vital importance to . . . socio-economic and technological development". In addition, the Agreement underscores the LDCs' "need for flexibility to create a viable technological base" (Article 66), among other provisions favouring this group of countries. The meaning of these provisions will depend on evolving national practice and future discussions within the framework of the Council for the TRIPS Agreement.

125. When considering the implementation of specific patent standards, it is helpful to distinguish between traditional and non-traditional (new technologies) objects of protection in view of the new and complex nature of the issues posed by the latter.

### 1. TRADITIONAL OBJECTS OF PROTECTION: GENERAL CONSIDERATIONS

#### (a) Novelty

126. There is no agreed international standard of absolute novelty and, within limits, member countries may apply the different approaches recognized in domestic patent laws. Thus, developing countries may allow oral prior art to defeat novelty, and they may not wish to provide any novelty grace period at all (in keep-

<sup>43</sup> "Members may, but shall not be obliged to, implement in their law more extensive protection than is required by this Agreement, provided that such protection does not contravene the provisions of this Agreement. Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice." (Article 1.1.)

ing with the current majority rule) because such a period creates uncertainty that may eventually lead to costly litigation and may also slow the pace of local innovation. However, eliminating a novelty grace period puts some pressure on local inventors, who must not publish or commercialize their inventions prior to filing patent applications on pain of forfeiting novelty.

127. National legislators must also decide whether to allow the patentability of new applications of existing products. Legislation may not allow claims for second uses of known products if a strict novelty criterion is applied. When such claims are allowed, it may reduce the impact of patenting in a given field but, at the same time, it would stimulate innovation with regard to applications that local innovators may be able to introduce.

#### (b) *Inventive activity*

128. Similarly, there is no international agreement or uniform set of guidelines for implementing the now universal eligibility criterion of "inventive activity" or "non-obviousness." Thus, relatively high levels of non-obviousness may be required by domestic law and practice which, within reasonable limits, would tend to narrow the scope of patentability and to broaden the prospects for competitive innovation around patented inventions. A national "opposition" system seems uniformly advisable because it enables interested parties to provide relevant prior art and also because it strengthens the search capabilities of domestic patent offices.

129. Countries seeking to implement a high standard of inventive activity ("non-obviousness") may base the test of whether "a person skilled in the art would have made the discovery in due course" on a world standard rather than on a local standard. This would ensure that "mere detail patents of the type that tend to be market-induced rather than truly revolutionary or basic inventions are not granted" (Oddi, 1996, pp. 484-485).

130. However, high standards of inventive activity or non-obviousness (applied without discrimination, as the TRIPS Agreement requires) could adversely affect some local inventors who must meet the same standards. This would seldom trouble LDCs, but it could create problems for more technologically advanced developing countries whose need for local patenting may gradually approximate that of developed countries. Between these two extremes, most developing countries must weigh the access benefits of a high standard of inventive activity against the local inventors' needs for incentives and attempt to strike a favourable balance. Implementing a refined non-obviousness standard in a reasonable fashion, without arbitrary results, also requires a high level of technical skill and other, often costly, resources.

#### (c) *Disclosure and publication*

131. The international patent system, as reformed by the TRIPS Agreement, mandates full disclosure of the nature of patentable inventions (Article 29). An explanation of the best mode of practising an invention that was known to the inventor at the time of filing may also be requested. Developing countries could strictly implement these standards with a view to facilitating competi-

tive innovation, adapting protected inventions to local conditions, or merely practising them once the term of protection expires.

132. The overall aim of the disclosure principle is to enable third parties to practise the invention in the particular country where protection is applied for. Mere translations of patent applications as originally filed in other countries may not be sufficient. "The statutory requirements for enabling disclosure could be quite specific in requiring specifications, blueprints, dimensions, chemical compositions, exact temperatures, pressures, bill of materials, equipment requirements, etc." (Oddi, 1996, p. 483).

133. The publication of patent applications, rather than of patents, once granted, may encourage local firms to make systematic use of the information they contain in order to examine possible uses, request voluntary licences or develop new products and methods of their own. Applications could be published at any time after filing. Many countries apply an 18-month period, although there is no binding minimum term in this respect.

#### (d) *Scope of protection*

134. As regards the scope of patent protection, no agreed international minimum standards currently regulate claims interpretation or the doctrine of equivalents, and national practice varies widely in these matters. The doctrine of equivalents specifies the characteristics of products that would be deemed equivalent to the protected goods and thereby excluded from competition. A strict construction of claims and a narrow doctrine of equivalents expands the field available for competitors to work around, improve or adapt protected inventions. This approach, if coupled with early publication of the application, promotes the diffusion and improvement of new technology and the use of improvement patents with a narrow scope. The availability of compulsory licences (Article 31.1) should be borne in mind, as this deals directly with the issue of improvement patents.

#### (e) *Exceptions to exclusive rights*

135. The TRIPS Agreement (Article 30) defines the limits that WTO member countries may impose on patentees' exclusive rights. Such exceptions must not conflict with a normal exploitation of the patent and should not unreasonably prejudice the legitimate interests of the patent owner. In this context, several TRIPS-consistent exceptions are worth considering.

136. For example, one exception recognized by the Community Patent Convention (CPC) allows individuals to engage in private, non-commercial use of patented technology for certain limited purposes. Another closely related exception, also recognized by the CPC, permits use of the patented invention for experimental purposes.<sup>44</sup> This exception is meant to encourage innovation and research and to create additional sources of technical information of benefit to the public at large.

<sup>44</sup> See Article 31 of the Convention for the European Patent for the Common Market (Community Patent Convention), Luxembourg, 15 December 1975.

137. Similarly, in some countries the use of pharmaceutical inventions is allowed before the expiration of the patent in order for a third party to obtain government approval to commercialize the product immediately after the patent expires. Another common exception (“*bona fide* prior use”) aims at preserving the rights of prior users of a subsequently patented invention in order to allow them to continue their use of that invention in their own enterprises.

138. Member countries also have the option (under Article 6 of the TRIPS Agreement) to adopt a worldwide exhaustion doctrine that could build upon the experience of economic integration schemes of industrialized countries. There is some risk, however, that overuse of the exhaustion doctrine could impel big companies to end price discrimination that might favour developing countries with respect to certain products.

(f) *Other uses without the patentee’s authorization*

139. The TRIPS Agreement provides a number of mechanisms to foster competition and innovation and to restore market forces when unjustifiably suppressed or distorted by the exercise of patent rights. One such set of mechanisms is treated under the rubric of other “uses without the authorization” of the patent holder.

140. Developing countries may require uses without the authorization of the patentee on a variety of grounds, which are not limited by the Agreement. However, these impositions are subject to conditions that attempt to balance the patentees’ interests against those of the public. Ancillary measures in competition law and related doctrines of misuse of patents may also play a critical role in the developing countries’ overall strategy (see section VIII below).

141. Both the public-interest clause and measures to prevent abuse (stipulated in Article 8 of the TRIPS Agreement) can justify resort to uses without the authorization of the right holder (compulsory licensing). Article 31 requires the would-be licensee to seek a negotiated licence from the right holder, and failing this to pay equitable compensation. The refusal to grant a licence on reasonable terms and conditions could, in itself, justify the granting of a compulsory licence.<sup>45</sup>

142. The requirement that would-be compulsory licensees negotiate seriously with right holders to obtain exclusive licences on reasonable terms should increase the pressure on patentees to accommodate pricing and other strategies to local market conditions. This, in turn, should lessen the need for Governments to seek compulsory licensing in the first instance.

## 2. NEW TECHNOLOGIES

143. There is no international consensus governing the patenting of certain new technologies that fit imperfectly within the classical patent and copyright paradigms, especially advances in genetic engineering and

computer science. Some of the problems and opportunities that this presents for developing countries are briefly outlined below.

### (a) *Biotechnology*

144. The patenting of genetically engineered products has grown more controversial over time both with respect to the technical issues of patent law as such and, more recently, with respect to ethical issues. This uncertainty is already evident in the relevant provisions of the TRIPS Agreement, which allow countries not to patent higher organisms, whether plant or animal, and “essentially biological processes for the production of plants or animals”. However, adherents to the TRIPS Agreement must generally provide patent protection for micro-organisms and for “non-biological and microbiological processes” on the doubtful premise that the patenting of micro-organisms and microbiological processes does not entail the protection of life forms. In the same vein, a country that excludes plants from its domestic plant law must protect plant varieties under a *sui generis* regime. The TRIPS Agreement requires a WTO review of the operation of the biotechnology provisions in four years’ time (Article 27.3 (b)) (see table 3).

145. In this connection, it is worth noting that the TRIPS Agreement contains no definition of “invention” and therefore leaves member countries relatively free to draw the line between nonpatentable “discoveries” and actual “inventions” in the biological field. Thus, domestic legislation may exclude the protection of substances found in nature, including cells and subcellular components (such as genes), and it may develop a policy approach that comprehensively addresses problems of access to, and appropriation of, genetic resources.

146. The lack of consensus concerning biological patents thus allows countries considerable leeway in fashioning their policy options. Besides implementing the permissible subject-matter exclusions as such, States may limit the availability of patents for biological inventions by insisting on strict standards of novelty, utility, nonobviousness, and disclosure, provided that the administrative or judicial applications of these standards are carefully reasoned, were not based on arbitrary or capricious value judgements, and are uniformly applied to nationals and foreigners alike (see UNCTAD, 1993). Even when biogenetic patents are issued, courts and administrators may legitimately afford them a narrow scope of protection despite tendencies to honour broad claims in some developed countries.

147. However, policy-makers need to weigh the consequences of such a strategy against the overall objectives of a given innovation system. While limiting patent protection of genetically engineered products could allow local industry much greater scope for reverse engineering by honest means, it might also discourage authorized foreign transfers of the relevant technology and materials, and it could skew investments by local firms in these same technological pursuits. The right balance will thus depend on the strengths and weaknesses of the local scientific and industrial capabilities in biotechnology. Some developing countries already possess the capabilities for undertaking genetic

<sup>45</sup> The practical effects of Article 31 of the TRIPS Agreement (other use without authorization of the right holder) in the context of the overall provisions of the Agreement and of the Paris Convention is a subject that merits further examination and research.

TABLE 3

## Main dates in the application of the TRIPS Agreement

|   |           |          |          |
|---|-----------|----------|----------|
| Final Act of the results of the Uruguay Round   | 15.4.1994 |          |          |
| Entry into force of the WTO Agreement   |           | 1.1.1995 |          |
| Special arrangements for pharmaceuticals and agricultural chemical products not protected in a member country as of the date of entry into force of the Agreement (Art. 70.8-9) |           |          |          |
| (a) Means for filing applications   |           | 1.1.1995 |          |
| (b) Criteria for patentability (to be applied as of the time that the patent protection has become available in the country in question)  |           |          |          |
| (c) Exclusive marketing rights for five years (to be applied once all conditions of Article 70.9 are met)   |           |          |          |
| Entry into force of TRIPS Agreement (Art. 65.1)   |           |          | 1.1.1996 |
| National treatment principles applicable to all countries   |           |          | 1.1.1996 |
| Most-favoured-nation treatment applicable to all countries (Art. 4)   |           |          | 1.1.1996 |
| Review of issue of patentability of plants and animals other than micro-organisms (Art. 27.3 (b))   |           |          | 1.1.1999 |
| Transitional arrangement for developing countries (Art. 65.2)   |           |          | 1.1.2000 |
| Transitional arrangement for economies in transition, but only if conditions of Article 65.3 are met  |           |          | 1.1.2000 |
| Review and amendment by Council of TRIPS Agreement (Art. 71.1)  |           |          |          |
| Transitional arrangement for developing countries concerning product patent protection—to technologies not previously protected by product patents (Art. 65.4)                  |           |          | 1.1.2005 |
| Transitional arrangements for least developed countries (Art. 66.1)   |           |          | 1.1.2006 |

research which they wish to develop, and the level of protection adopted could affect their prospects for joint ventures with firms in developed countries. Adoption of the appropriate mix of legal incentives for biotechnology will thus require a sustained exercise in national policy-making.

148. Finally, particular problems have arisen with regard to the disclosure of biotechnological inventions because interested parties sometimes need access to the physical product and not just a description of it. Domestic legislation needs to determine where the deposit of such materials should be effected, the conditions for maintenance of samples, and the conditions under which third parties may have access to them. Access may be granted—for experimental purposes—after the application has been published in order to speed up the likely applications of the invention and to further the innova-

tion process. The Budapest Treaty,<sup>46</sup> which provides rules for the recognition of international authorities of deposit, may facilitate the tasks of industrial property offices in developing countries.

(b) *Plant varieties*

149. The TRIPS Agreement leaves member countries free to devise protection for plant varieties, either by means of patents or by an “effective” *sui generis* regime, or by some combination of both modalities (Article 27.3 (b)). Most developing countries currently do not confer protection on plant varieties in any manner.

<sup>46</sup> Budapest Treaty on the International Recognition of the Deposit of Micro-organisms for the Purposes of Patent Procedures, Budapest Treaty (1977), modified in 1980.

150. The development of a legal regime to comply with this obligation may thus follow different approaches. Some evidence is available concerning the effects of protecting plant-breeders' rights in some Latin American countries, as discussed in Annex Two. The UPOV Convention<sup>47</sup> provides a general framework in which new regulations may be developed, including the recognition of the breeders' exemption (of particular importance to ensure continuous innovation) and the "farmers' privilege" (an exemption relating to the re-use of protected seeds by the farmer on his or her own farm).

151. A *sui generis* regime may also incorporate elements aimed at strengthening the conservation of biodiversity, particularly by taking into account the contributions made by traditional farmers through the continuous improvement of existing non-commercial plant varieties. *Sui generis* legislation may also foster the objectives of the Convention on Biological Diversity<sup>48</sup> by facilitating the sharing of benefits between the users and providers of germplasm, for instance by requiring that applicants for protection be obliged to disclose the place of origin of the material and to provide evidence that prior consent was obtained.

#### (c) Computer-programme-related inventions

152. The TRIPS Agreement has opted primarily for copyright protection of computer programmes, as supplemented by trade secret law. It makes no mention of patent protection, the availability of which remains controversial even in the developed countries.

153. Historically, the developed countries, especially the United States, were reluctant to patent computer-programme-related inventions at all. The European Community Patent Convention is still couched in terms that ban the issuance of such patents. In practice, however, the patent offices of the United States, Japan and even the European Union countries have increasingly granted patents covering industrial applications of computer programmes that produce specified technical effects while claiming that algorithms as such remain ineligible. This practice seems likely to grow, in part because of inherent limits on copyright protection and in part because, in a more mature software industry, producers may need higher levels of technical achievement than in the past to penetrate crowded market segments. However, the fact that the TRIPS Agreement omits any mention of software patents or otherwise declines to deal with the difficulties that this subject matter has engendered everywhere also means that it provides no statutory basis for overcoming the formidable obstacles to patentability that have at times been revealed in most developed countries' legal systems (Reichman, 1995a).

<sup>47</sup> Convention of New Varieties of Plants (UPOV), UPOV Convention (1961) as revised.

<sup>48</sup> See United Nations Conference on Environment and Development: Convention on Biological Diversity, Rio de Janeiro, 5 June 1992.

#### D. Direct costs of implementation

154. A serious constraint on patent policy-making in developing countries is likely to be the high cost of maintaining administrative capabilities to implement the new standards on a case-by-case basis and of training skilled personnel. To some extent, countries can defray these costs from fees imposed and registration procedures, provided that such charges are consistent with the "reasonable procedures and formalities" clause under the TRIPS Agreement (Article 62) and with state practice generally. Countries may receive technical assistance for this purpose under the TRIPS Agreement itself.

155. Countries required to expand patent protection will, in particular, face increasing administrative costs stemming from a larger number of applications and patent grants. For instance, adequate administration may require the installation of computer facilities, and the related investments in personnel and maintenance, to process patent applications from filing to grant. This includes everything from searching the national and international repositories bearing on the state of the art to handling oppositions and publication of bulletins.

156. Such increases in costs may be at least partially, or totally, compensated by fees to be borne by applicants, which may comprise fees for filing, examination, publication, registration, and maintenance. A surcharge may also be established to provide for a self-financing agency and also to generate funds for other complementary activities, such as training. Such a surcharge could be calculated, for instance, in accordance with the sectors involved and the complexity or intensity of patenting activities in any given office.

157. Policies on fees may, however, consider factors other than budgetary concerns. For instance, fees could be reduced if the local firms are licensed or if a negotiation otherwise leads to effective transfer of technology and local working. States may also provide extra incentives to stimulate investment in certain high-priority technological fields.

158. One of the main financial burdens in the patent field may derive from the application of Articles 27.1 and 29 of the TRIPS Agreement, insofar as they make it necessary to examine the existence of the requirements for patentability. Determining the patentability of biotechnological inventions in particular, including a requirement of deposit of biological materials, may add significant costs. These costs, however, may be contained by a number of mechanisms. The TRIPS Agreement itself refers to the possibility of accessing information on foreign applications and grants (Article 29.2), information that, while respecting the principle of territoriality, may include results of prior invalidation proceedings at the administrative or judicial level. As noted, an opposition system also enables interested parties to provide relevant prior art and strengthens the search capabilities of the domestic patent offices. The deposit of biological materials may be facilitated, as mentioned before, by the application of the Budapest Treaty.

159. Despite the above, prior examination may be very costly and difficult to make with very limited staff and bibliographic support. Researchers at universities and other laboratories may be subcontracted (under confidentiality obligations) to provide technical reports (the cost of which should be borne by the applicants). Another alternative is to provide for a "deferred system" of prior examination, whereby a special request for examination needs to be made by the applicant after a certain period. Some inventors may have decided to abandon the application, so that the number of applications to be examined is thereby reduced.

160. Finally, regional and international cooperation may play a crucial role in creating an adequate infrastructure in developing countries and in training personnel, or in allowing for the centralization of certain technical tasks. Adherence to the Patent Cooperation Treaty,<sup>49</sup> in particular, can be an instrument of great significance in this regard.

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<sup>49</sup> Patent Cooperation Treaty, PCT (Washington, 1970), amended in 1979 and modified in 1984.

### III. COPYRIGHTS

#### A. Relevant TRIPS Agreement standards

161. The TRIPS Agreement (Part II, Section 1) sets forth standards for the protection of authors, broadcasting organizations, performers and phonogram producers. The main obligations imposed by the TRIPS Agreement in the area of copyright and related rights include: (i) protection of works covered by the Berne Convention,<sup>50</sup> excluding moral rights, with respect to the expression and not the ideas, procedures, methods of operation or mathematical concepts as such (Article 9); (ii) protection of computer programmes as literary works and of compilations of data (Article 10); (iii) recognition of rental rights, at least for phonograms, computer programmes, and cinematographic works (except if rental has not led to widespread copying that impairs the reproduction right) (Article 11); (iv) recognition of rights of performers, producers of phonograms and broadcasting organizations (Article 14).

162. In addition, the Agreement (Article 51) obliges member countries to take measures at the border with regard to suspected "pirated" copyright goods and requires criminal procedures and penalties to be applied in cases of "copyright piracy"<sup>51</sup> on a commercial scale (Article 61). As with other matters covered by the Agreement, developing and least-developed countries enjoy transitional periods to implement their obligations relating to copyright and related rights.

#### B. Main implications

163. Copyrights provide an exclusive right to make and sell copies of a particular expression and also of derivative works, such as translations, marketing images of a comic strip character, etc. The right extends for a limited time period, with the standard period generally being the life of the creator plus 50 years. The time period is quite long so that creators can expect to earn a return—which is sometimes wildly high and sometimes non-existent—over costs, plus a risk premium. The protection is more limited in scope than patent protection and is therefore compensated by a longer period of protection. But the period is limited so that society can ultimately gain from having artistic works become freely

available. The copyright extends to control over derivative products in part for artistic reasons, because the creator wants some control over the quality of derivatives. It also extends in this way for the sound economic reason that transaction costs inherent in multiple copyright owners are inefficient. Finally, the copyright gives the author-creator the right to assign his rights to a more efficient distributor, such as a publisher or music company, in return for royalties.

164. The economics of copyrights are rather like those of patents, although except for software there is little scope for creating dominant market positions through copyrights because of the virtually unlimited universe of ways to express an idea. Overall, copyright protection may be adequately described as a market-based system. The economic goals of the copyright system are analogous to patent objectives. First, society wants to provide incentives for talented people to create new works of art, music, literature and cinema. Protection is necessary, because without copyrights it would be easy to free-ride on these creative efforts and the price of artistic goods would collapse to the cost of copying them. Copyrights are also required because there is great uncertainty about the likely success of a new creation and sometimes the cost of developing it is huge, as is the case with a film or symphony. Furthermore, free riders would be able to tell with certainty which works are worth copying, so that the uncertainty resolves itself in a perverse way. Secondly, society wishes to provide incentives in a low-cost, market-based approach. As with patents, therefore, there are important limits on the scope of copyrights. The foremost limitation is the fair-use doctrine. Follow-on creation is an important source of cultural and economic growth in that scientific progress and education require reasonable access to prior research and literature. In consequence, fair use allows some unauthorized copying for expressly limited purposes. Thirdly, reverse engineering, or decompilation, of software protected by copyright is allowed in order to understand the unprotected aspects of the code and to facilitate the development of new software. In summary, copyright involves providing exclusive use for particular expressions, subject to some public-interest limitations.

165. The economic implications of the strengthening of the protection of copyright and related rights need to be examined with respect to the substantive provisions of the Agreement and in the light of the provisions on enforcement, particularly as referred to above.

166. Literary and artistic creativity is universally distributed, and situational disadvantages seldom preclude authors in developing countries from entering domestic or foreign markets. Many developing countries participate fully in these markets. Such rights thus

<sup>50</sup> Berne Convention for the Protection of Literary and Artistic Works, Berne Convention (1886), as revised and amended.

<sup>51</sup> For the purposes of the TRIPS Agreement, "pirated copyright goods" means any goods made without the consent of the right-holder or person duly authorized by the right-holder in the country of production and which are made directly or indirectly from an article where the making of that copy would have constituted an infringement of a copyright or a related right under the law of the country of importation (footnote to Article 51).

become vehicles for the development of autonomous cultural industries everywhere and for the preservation and enhancement of the developing country's own cultural heritage. Even mandatory recognition of neighbouring rights affords opportunities to countries whose music, dance and folklore are important components of the national heritage, as attested by the fact that over half of the parties to the Rome Convention<sup>52</sup> are developing countries.

167. Hence, authors of literary, artistic and scientific works in all member countries may benefit from a strengthened protection of their rights on an international scale. Cinematographic authors, in particular, have explicitly recognized rental rights under the TRIPS Agreement, although subject to a broad exception (Article 11). This recognition may benefit many developing countries, particularly those that have been able to develop strong film industries.

168. In addition, neighbouring rights may be of particular interest to countries endowed with oral traditions and culture, in the representation of which "authors" are usually performers as well. Expressions of folklore that often fail to qualify for copyright protection can thus indirectly obtain protection from rights in performances, fixations and broadcasts. Similarly, the protection of phonogram producers allows developing countries to establish their own sound-recording industries which promote the dissemination of national culture, both within and outside the country, and also foster export opportunities. In the same vein, broadcasting organizations in developing countries can benefit from protecting costly programmes against unauthorized reproduction, and re-broadcasts of major culture and sports programmes abroad are potential sources of foreign exchange.

169. To these ends, developing countries need to establish an institutional framework, including national collection societies, in order to ensure that public and private funds invested in the production of cultural goods bear fruit on both domestic and foreign markets. These agencies may also assist local authors and artists in restoring copyrights or neighbouring rights protection to any works of national origin that foreign authorities must now remove from the public domain by virtue of the Berne Convention and relevant provisions of the TRIPS Agreement.

170. While a stronger protection of conventional literary, artistic and scientific works is likely to stimulate creation and related economic activities worldwide, the strengthened protection of computer programmes, phonograms and databases will at first sight improve the market position of countries with a solid stand in those industries. The example of computer software is, however, illustrative of the kind of implications of the Agreement for developing countries in these areas.

171. In the area of computer programmes, despite the relatively low technical barriers to entry, developing countries' firms still have a very modest participation in

the global market, particularly in the dynamic area of "packaged" software. Software production and trade is today largely the business of firms established in developed countries. In 1994, the global market for "packaged" software was estimated at US\$ 78.8 billion, of which the 22 OECD countries accounted for 94 per cent.<sup>53</sup>

172. A stronger protection of computer programmes may imply price increases and changes in the market structure, with an ambiguous, still largely unexplored impact on consumers, producers and society at large in developing countries. While higher prices may limit access to protected works (particularly in low-income countries) and thereby slow down the diffusion of computer technologies (an essential tool to increase productivity), they may also encourage the local development of computer programmes, better adapted to local conditions. Thus, the cost-benefit of reinforced protection would have to be judged in terms of both impact on the diffusion of computer technology, including in particular for educational purposes, and the improved opportunities given to local producers, who would not be able to start up and grow if they were victims of the inexpensive and easy-to-make copying of their products.

173. The TRIPS Agreement strengthens the protection of computer programmes—which are to be dealt with as literary works—against slavish copying, but it promotes competition by allowing reverse engineering of existing computer programmes, as further discussed below. This expands the opportunities of firms in developing countries to develop substitute or interoperable programmes and to enhance their participation in the world market.

174. In the area of phonogram production, firms in developed countries also hold a strong market position. The extent to which developing countries could also benefit from strengthened protection needs to be further investigated, in particular in terms of the impact on culture and creative activities. In the musical field, for instance, authors and performers may benefit from a better protection of phonograms if the eventual increase in income of phonogram producers is shared with those who created and performed the work.

175. The database industry has developed faster and more strongly in developed countries than it has in developing countries, but the latter may take advantage of the rapid changes in information technologies to eventually catch up. A challenge for developing countries is how to obtain digitized information needed for economic development at prices users can afford. Because subscribers entering any on-line database must log in and out, each and every use of electronically processed information may be charged, even though the copyright law itself grants no exclusive right to control either end-use or the use of disparate facts in particular. However, with increasing globalization of networking systems, the implementation of such a scheme may not be that easy. A comparable situation arises when dissemination occurs in hard-copy form, such as a CD-ROM.

<sup>52</sup> International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, Rome Convention (1961).

<sup>53</sup> See OECD (1996).

## C. Implementation

### 1. SCOPE OF PROTECTION

176. Despite the elaborate set of norms governing international copyright relations in general, the scope of copyright protection varies from country to country and from case to case with little in the way of authoritative legal limitations recognized by international law, including the TRIPS Agreement standards. For example, international law formally protects the copyright owner's exclusive adaptation right, i.e. the right to prepare derivative works. Even so, there is no international norm governing non-literal copying, as distinct from literal violations of exclusive reproduction rights, and State practice varies widely in this regard. As explained below, some subject categories, notably functional and factual works, receive "thin" protection and disfavoured treatment, a tendency that strengthens the role of competition in the market of information technologies.

177. The provision by legislation of public-interest exceptions can mitigate any overall social costs that may be imposed by the implementation of the TRIPS Agreement. For example, the fair-use exception disculpates certain unauthorized but socially beneficial uses, either because transaction costs might otherwise stand in the way of negotiated licences, or because the resulting public benefit is thought to outweigh the loss of private gain. The fair-use exception also perfects a broader legislative denial in most countries of any exclusive right to use the copyrighted work over and above those specific uses protected under the Berne Convention. Legislation may also expressly recognize a "private-use" exception to the exclusive reproduction right, which extends the benefits of the "fair-use" principle beyond the scientific and educational communities. Moreover, the traditional first sale doctrine (that is, the principle of exhaustion), which limits the exclusive distribution right, authorizes those who purchase copies of protected works to use and dispose of these copies as they wish, although this doctrine has recently been limited with respect to rental rights in cinematographic works, phonograms, and computer programmes.

178. In addition to the traditional fair-use exceptions, both domestic and international law recognize other exemptions and immunities for educational and social purposes, as well as, in some countries, compulsory licences for recorded musical work and broadcasts. Still other limitations arise from the state's general exercise of its police powers and from abuses of the statutory monopoly, whether or not rising to the level of antitrust violations. In some countries, even the protection of moral rights assumes a public-interest character by enabling state authorities to preserve the integrity of cultural goods beyond the lifetimes of their creator or, in the case of folklore, in the absence of a specifically identifiable author.

179. The Rome Convention, as partly incorporated by reference into the TRIPS Agreement, allows domestic laws to exempt both private use and uses for the purpose of teaching or scientific research. Such licences also extend to computer programmes "as literary works" under the Berne Convention. However, the concessions

granted to developing countries under the Appendix to the Berne Convention require express renewals by qualifying developing countries at periodic intervals. New adherents to the Berne Convention remain entitled to these concessions, if they so request.

### 2. COMPUTER PROGRAMMES

180. According to the TRIPS Agreement, copyright proprietors will obtain the exclusive rights specified in the Berne Convention, the rental rights conferred on computer programmes under Article 11 of the Agreement, and the guaranteed minimum terms of protection as specified in both these instruments. In addition, titleholders benefit from all the enforcement measures that the TRIPS Agreement mandates, including the right to obtain preliminary injunctions and the right to exclude trade in "pirated" software. This battery of rights and remedies will greatly benefit software producers and exporters on a worldwide scale.

181. The TRIPS Agreement does not define, however, the eligibility criteria that members must apply to computer programmes, nor, apart from a generalized exclusion of "ideas, procedures, methods of operation or mathematical concepts as such" (Article 9.2), does the Agreement concern itself with the scope of copyright protection for this subject matter. Meanwhile, the software industry keeps evolving at a rapid pace, as does litigation in some countries concerning copyright protection of computer programmes.

182. Thus, the TRIPS Agreement allows for reverse engineering of computer programmes by honest avenues. This means that, although wholesale copying of computer programmes is prohibited, the practice of reimplementing functional components of a protected programme in "clones" is not. Programmes that are independently coded and yet that deliver essentially the same functional performance or behaviour as the originator's own software do not infringe the latter's rights. This may boost competition and innovation by firms in all countries, including in developing countries where some capabilities for the production of software already exist.

183. Software producers may also benefit from provisions in the TRIPS Agreement requiring WTO members to protect undisclosed information and to repress unfair competition, as from the copyright provisions analysed above. For example, once domestic laws to protect undisclosed information are enacted in conformity with Article 39, a local competitor whose conduct violates its provisions may become unable to profit from the improper acquisition of know-how that copyright laws may otherwise have left unprotected. Similarly, the unfair competition norms incorporated into the TRIPS Agreement through Article 10 *bis* of the Paris Convention prevent competitors from copying trademarks or "trade dress" even though they may otherwise imitate non-copyrightable components of foreign computer programmes.

184. As mentioned, while reverse engineering is allowed under the Agreement, independent efforts to develop computer programmes that meet local industrial and administrative needs may sometimes pay bigger

dividends than reimplementing foreign products, which is generally a costly endeavour requiring high technical skills. The potential benefits of obtaining the most up-to-date software by means of direct investment, licensing or other arrangements should always be weighed against reimplementation of existing software.

#### **D. Direct costs of implementation**

185. Since there are no formalities for the acquisition of copyrights and related rights, the expansion and strengthening of protection will not necessarily lead to increased administrative costs. However, deposit of works is required in some countries for specific legal

purposes or is convenient for the purposes of proof in eventual litigation. The TRIPS Agreement may, therefore, have an impact on the volume of work of copyright offices and may require additional resources (mainly personnel and computer facilities), as discussed in part one.

186. The main direct costs for implementing the TRIPS Agreement copyright provisions may stem from enforcement. Administrative (police and customs) and judicial authorities may be increasingly involved in procedures regarding injunctions and other remedies, suspension of release of products into circulation, and other enforcement-related procedures. This may imply significant costs—yet to be estimated—that, in principle, will be only partially absorbed by the title-holders.

## IV. TRADEMARKS AND GEOGRAPHICAL INDICATIONS

### A. Relevant TRIPS Agreement standards

187. The TRIPS Agreement may require changes in legislation with regard to several aspects of trademark law, including strengthening protection of service-marks and of well-known marks. In this area, however, the implementation of enforcement rules and, particularly, requirements related to border measures may have greater implications than the provisions relating to the availability of rights as such. Like other intellectual property rights, geographical indications are subject to the general principles (Part I of the TRIPS Agreement) and to the provisions on enforcement (Part III). This is a case in which members not only assume obligations with regard to the level and actual enforceability of rights, but also undertake further negotiations to increase the level of protection and to develop an international system of notification and registration (Article 24).

### B. Main implications

#### 1. TRADEMARKS

188. The protection of trademarks benefits producers, traders and consumers in developed and developing countries alike. The economic justification for trademarks and related protective devices is straightforward. Firms invest resources in their reputation for quality by building up reliable consumption characteristics and guaranteed services. They must have an easy way of communicating to consumers the quality levels of their products. A trademark is basically a guarantee of a particular set of quality characteristics. If it were not protected by the right to exclude others from using the trademark and by the right to license its use, other firms would quickly expropriate the trademark's value by selling cheaper items under the mark. The original firm would suffer a lower return on its investments. In turn, there would be little investment in quality differentiation.

189. The social benefits of trademarks therefore include higher-quality products, differentiated products appealing to consumers' preference for variety, and lower search costs for consumers due to absence of confusion, which is the largest social gain. Overall, economists are confident that there are significant net benefits to a well-functioning trademark system in market economies. Indeed, trademark protection could be particularly valuable in developing countries because of the potential to develop brand recognition for high-quality crafts, clothing, and music.

190. Strengthened trademark regimes may encourage both direct investment and licensing by foreign producers who seek to monitor quality and to maintain brand names and goodwill in the international market generally. On the whole, more technology will be licensed to domestic firms when the licensor can both lower transaction costs by recourse to standard intellectual property norms and maintain quality controls through trademark licence agreements. Local production under licence then reduces the need for imports and helps to build an industrial infrastructure.

191. Enterprises in developing countries may establish their own market identities through appropriate trademarks and offer products that can be distinguished from those already on the market. Governments in some developing countries may consider policies and incentives that encourage foreign firms to allow licensees to adapt more of the licensed products for both domestic and export needs and promote the use of local trademarks.<sup>54</sup> The success of Japanese industry in importing foreign technology while developing indigenous marks constitutes an example for other countries to emulate, even if countries at lower stages of development may have less bargaining power when formulating appropriate regulations and may, therefore, remain more dependent on the introduction of foreign marks.

192. The market power conferred by trademarks varies enormously depending on the branches, products and services involved. Excessive pricing or other unreasonable commercial conditions eventually imposed by trademark owners may be tackled with various mechanisms. In particular, the admissibility of parallel imports (if allowed by national legislation) may foster sound competition to the extent that they permit access to legitimate products commercialized under more favourable conditions abroad. This may avoid price discrimination to the detriment of the consumer and increase the social gains of the protection. The realization of these gains, however, may be impaired if the use of trademarks on parallel imported products creates confusion for the public about the quality and other characteristics of the protected products or services.

<sup>54</sup> Attention should be drawn to Article 20 of the TRIPS Agreement which provides that "the use of a trademark in the course of trade shall not be unjustifiably encumbered by special requirements, such as use with another trademark, use in a special form or use in a manner detrimental to its capability to distinguish the goods or services of one undertaking from those of other undertakings. This will not preclude a requirement prescribing the use of the trademark identifying the undertaking producing the goods or services along with, but without linking it to, the trademark distinguishing the specific goods or services in question of that undertaking".

193. Although trademarks encourage the production of quality goods, control over quality may lead to control over price and other anti-competitive consequences. Accordingly, strengthened trademark regimes should be complemented with up-to-date regulations dealing directly with the abusive licensing practices that may flow from market power, as discussed elsewhere in this report. Another important economic issue relating to higher standards and, above all, improved enforcement of trademark rights is the possible displacement of counterfeiting activities.<sup>55</sup>

194. In an integrated world market where products of different countries circulate freely and prices are determined by open competition, it is hard to see any social benefits resulting from a toleration of trade in counterfeit goods to any country, at least in the medium and long term. Border controls are thus a logical outgrowth of both the provisions on trademarks in general and the provisions that incorporate the international standards of unfair competition law set out in Article 10 *bis* of the Paris Convention into the TRIPS Agreement. Hence, the imposition of border controls to repress imports of counterfeit goods represents one significant result of the TRIPS Agreement, provided that countries implement these measures in a genuinely non-discriminatory fashion and do not erect disguised barriers to trade.

195. The implementation of trademark protection, in displacing the production of and trade in counterfeiting products, is likely to affect employment, industrial output and exports in several countries. One way to attenuate displacement costs is to convert affected industries to the production of clearly marked substitute goods that establish their own niche by means of price competition with more costly foreign goods. Such products could eventually compete on export markets under indigenous brand names so long as efforts are made to maintain reasonable price-quality correlations. Existing GSP<sup>56</sup> privileges, as well as enhanced market opportunities after the Uruguay Round, could make such conversion more attractive.

## 2. GEOGRAPHICAL INDICATIONS

196. The protection of geographical indications, as provided for under the TRIPS Agreement, is certainly likely to benefit producers in those regions and countries that have already established the reputation of their products on the basis of the indication of their geographical origin. Benefits will also accrue to consumers worldwide, to the extent that the new standards reduce search costs and avoid confusion about the true origin and quality of the products.

197. Likewise, broader protection in this field may have positive effects on rural economies by increasing

farmers' incomes and investments in production and marketing of agricultural products and foodstuffs. Some developing countries have already established valuable geographical indications. Local qualifying products and industries may benefit from the TRIPS Agreement provisions over time, especially if economic development frees more funds for advertising and promotion.

198. The implementation of the TRIPS Agreement may, however, entail economic losses should the new standards require stopping the use of indications or trademarks that are in conflict with geographical indications protected under the Agreement. This may affect, in particular, wines and spirits, for which the protection conferred is stronger than for other products and where additional restrictions may stem from the negotiations that members have agreed to undertake (Article 24).

199. However, the transitional periods available under the Agreement (Articles 65 and 66), and the "grandfather clauses" provided for are likely to limit significantly any possible negative impact. Thus, members may continue to use names that have become "customary" or where use has taken place prior to the adoption of the Agreement (Article 24.4). A cost-benefit analysis should be made in each case to examine whether the use of geographical indications protected abroad, if permitted and not subject to "non-violatory" complaints, would be truly beneficial in the long term.

## C. Implementation

### 1. TRADEMARKS

200. On the whole, the TRIPS Agreement standards concerning trademarks may present few difficulties for developing countries at the implementation stage. The new standards build on an elaborate pre-existing set of norms under the Paris Convention, are rather detailed in nature and allow the coexistence of different national systems with regard to the acquisition of trademark rights, either by registration or by use. At the same time, the provisions on trademarks do not pose issues that could adversely affect domestic innovation systems, while a strengthened trademark regime would benefit firms and consumers alike in developing and least developing countries over time.

201. The provisions that require stronger protection for famous or "well-known" marks do not define "well-known" in legally operative terms. This raises the question of whether members will satisfy this requirement simply by prohibiting acts which tend to confuse consumers and to indicate false or confusing sponsorship (as was the case, for instance, under the United States Lanham Act) or whether they must provide full-fledged protection against "dilution" by use of a given mark on unrelated products. This second interpretation broadens the scope of protection eventually conferred to a "well-known" trademark, but legislation could limit itself to providing protection when consumers perceive a connection between the use of the owner's trademark and the dissimilar goods of which the offending use has been made.

<sup>55</sup> See also discussion in Part One, section III, above. For the purposes of the Agreement, "counterfeit trademark goods" shall mean any goods, including packaging bearing without authorization a trademark which is identical to the trademark validly registered in respect of such goods, or which cannot be distinguished in its essential aspects from such a trademark, and which thereby infringes the rights of the owner of the trademark in question under the law of the country of importation" (footnote to Article 51 of the Agreement).

<sup>56</sup> Generalized system of preferences.

202. Another aspect that national legislation should address is the new concept of knowledge obtained "as a result of the promotion of the trademark" (Article 16.2), which reduces the importance of actual commercialization of the marked product as a basis for establishing the notorious character of a trademark. Also of interest to developing countries is the fact that they are not required to make actual use a prerequisite for registering trademarks. This allows local entrepreneurs to register trademarks without showing actual use (Article 15.3).

203. As previously mentioned, the TRIPS Agreement sidestepped the question of the propriety of parallel imports of genuine goods under the doctrine of exhaustion. "Grey market" goods are legitimately trademarked genuine goods bought in one country and sold in another country without the consent of the trademark-owner. From a global and a national perspective, the free movement of legitimately trademarked goods may be regarded as promoting wealth, except where traded goods are defective, noxious, dangerous, or likely to cause confusion with the consumers with respect to certain attributes of the products.

204. As mentioned above, enforcement rules and particularly measures at the border are one of the important outcomes in the area of trademarks of the TRIPS Agreement. The problems with implementing border-control measures are largely of a practical and political nature, but they do not raise normative issues that need to be considered here. In general, border-control measures will succeed to the extent that the Member States enforce them vigilantly and no weak links appear in the chain of judicial and/or administrative procedures.

205. As indicated in a previous study (UNCTAD, 1994, p. 200), in conjunction with administrative arrangements, customs authorities are directly involved in the enforcement of the TRIPS Agreement. In many technology-importing countries, the emphasis of the customs inspection of imported goods is on product name, brand name, quality specification, product serial number, model number, countries of manufacture, quantity and net weight. Trademark infringement does not generally fall within the scope of inspection. If trademark-holders possess evidence of infringement or have obtained the necessary information, they may normally file a petition with the court for provisional attachment of the counterfeit goods, inform the prosecutor, or petition the trademark authorities. The customs will then be in a position to take action to seize such goods when so advised by the court or the intellectual property authority. In order for customs authorities to take measures on their own, a specific monitoring scheme would be needed for both imported and exported goods.

206. The implementation of the TRIPS Agreement also requires that customs be given the authority to take action against counterfeit elements, or parts thereof, that are imported for the purpose of assembling or producing a finished product to be exported to a third market. In order to cope with this kind of problem, several agencies could be involved. Questions of coordination and the necessary legal framework will arise, which would need to be further examined in developing countries that are

complying with the obligations envisaged in the TRIPS Agreement (UNCTAD, 1994, p. 201).

## 2. GEOGRAPHICAL INDICATIONS

207. Use of the "generic" defence to claims of protected indications of origin poses some thorny problems of interpretation and application, with particular regard to wines and spirits, especially given the various consumers' perceptions that may prevail in different countries with regard to some indications. The TRIPS Agreement does not define which legal standard will govern disputed questions of genericness—an aspect which currently creates considerable divergences among countries.

208. Similar uncertainty may be created by the application of other provisions of the Agreement, for instance, with regard to the extent that certain trademarks mislead the public. Given the direct interest (and involvement) of some Governments in the protection of geographical indications, tensions may arise if bilateral and multilateral agreements are not reached. Short-term gains obtained from restrictive interpretation of the provisions could be offset by later adverse decisions by WTO panels overruling local claims to use geographical indications.

## D. Direct costs of implementation

### 1. TRADEMARKS

209. The cost implications for developing countries of the new standards on trademarks can be expected at three levels: administration; judicial and customs enforcement; and displacement of counterfeiting activities. There may be increased costs in these three areas. In contrast, consumers may benefit from a more reliable system for the unambiguous identification of the source of products and services and by access to parallel imports, if allowed in a manner that does not deceive the public.

210. The registration of trademarks is normally the most important activity of industrial property offices in developing countries in terms of the number of applications to be examined and approved. The new standards set out in the TRIPS Agreement will not substantially alter the nature or volume of tasks to be undertaken. An efficient administration of trademark applications requires investment in a computerized system, including appropriate hardware and software, as well as in training of personnel. Fees charged for registration may totally or partially cover those costs, but the initial investments may require specific support from the Government or other organization (as discussed in part one).

211. Judicial enforcement and action by customs at the border relating to counterfeiting and other violations of trademark rights, as required by the Agreement, also demand qualified personnel and adequate infrastructure. The recovery of costs incurred may be more problematic than with registration, thus generating the need for specific funding by Governments. As a result of the broadening of the concept of "well-known" trademark in the TRIPS Agreement—as compared to the Paris

Convention—more litigation may be expected in this area, as the likelihood of confusion with pre-existing trademarks also increases. The costs of acquiring and maintaining trademark rights may therefore increase.

## 2. GEOGRAPHICAL INDICATIONS

212. The TRIPS Agreement does not mandate any particular form of protection for geographical indications and, hence, considerable room is left to define the role to be played by the State (and the consequent public financial burden) in this area. While in some countries the State currently plays a major role (e.g. Portugal, France, Italy), in others protection is mostly left to pri-

vate initiative. In any case, obligations under the Agreement depend upon the actual existence of protection of a geographical indication in the country of origin (Article 24.9).

213. The cost of implementation may derive from the elaboration of appropriate legislation, the enforcement of existing norms and eventually increased challenges to existing trademarks, as well as from further negotiations that Members are bound to undertake. The protection of geographical indications relating to wines and spirits, in particular, is likely to require a special effort by Governments, which have the option of providing protection either by judicial or by administrative means (Article 23.1, footnote).

## V. TRADE SECRETS AND CONFIDENTIAL INFORMATION

### A. Relevant TRIPS Agreement standards

214. The TRIPS Agreement is the first international convention expressly to require member countries to protect undisclosed information. A systematic failure to provide either trade secret protection or equivalent laws governing confidential disclosures should thus become actionable as a distinct component of the international regime of unfair competition law that Article 10 *bis* of the Paris Convention already covers. Violations of Article 10 *bis*, in turn become subject to the enforcement procedures and improved dispute-settlement machinery of the WTO Agreement as a whole.

215. In general, the TRIPS Agreement (Article 39) requires countries to protect information that is commercially valuable, secret, and subject to measures to prevent unauthorized disclosure against unfair commercial practices. Countries must also protect secret data submitted to government authorities in connection with applications for the approval of pharmaceutical and agrochemical products.

### B. Main implications

216. Historically, the protection of trade secrets raised fears that single innovators might create absolute and long-lasting barriers to entry through non-disclosure of their discoveries. The patent system counters this threat by encouraging full disclosure of technological breakthroughs in exchange for short-term exclusive rights. Some approaches towards trade-secret law remain largely coloured by this nineteenth century tradition, which rests on the legendary solitary inventor.

217. In modern economies based on constant technological innovation, however, the lone inventor has given way to team research conducted along scientific lines, often in universities or research institutes. The ability of any single firm to prevent others from duplicating undisclosed research results after an initial breakthrough has greatly diminished, while pressures within the university communities favour publication of basic research in the interests of science. As regards applications of basic research to industry in this environment, the protection of the patent system offsets some of its monopolistic effects by driving all routine innovation into free competition on the general products market. Trade-secret laws then regulate the pace of competition by protecting innovators against commercial bribery and industrial espionage, while endowing second-comers with an absolute right to reverse engineer or to independently discover unpatented innovation (Reichman, 1994, p. 330).

218. Recent studies have emphasized both the pro-competitive implications of classical trade-secret laws (and related laws of confidential information, which perform equivalent functions) and the limits of these laws under present-day conditions (UNCTAD 1993, Reichman, 1994). As noted, market economies rely on such laws to counteract the risk of market failure that arises if second-comers are freely able to appropriate the fruits of an innovator's time, money, and skilled efforts without making any corresponding investment of their own. However, trade-secret laws do not confer exclusive property rights on those whose innovations fall below the now worldwide standard of non-obviousness for eligibility in patent law. This follows because routine engineers would, in theory, discover most subpatentable innovations in due course for competitive purposes. Trade-secret laws require third parties to reverse engineer new and successful products by honest means, or to independently discover them, with a view to mastering the innovative processes from which they can manufacture competing products.

219. Because the task of reverse engineering by honest means takes time and costs money, it gives innovators a modicum of natural lead-time in which to recuperate their investments and to establish their trademarks and brand names as symbols of quality. By the same token, the competitor's investment in reverse engineering contributes indirectly to the relevant technical community's overall costs of research and development, and it usually ushers in improvements (or lower-priced goods) that advance the prevailing technical paradigms. Those competitors who find the task of reverse engineering by proper means too difficult or too costly may, instead, license the innovator's secret know-how contractually. In that case, the licensee will contribute directly to the innovator's costs of research and development without, however, either contracting party being able to prevent third parties from engaging in the task of reverse engineering at their expense. In either case, rules determining what constitutes honest or proper means of reverse engineering enable courts to distinguish between free-riders and fair-followers for purposes of unfair competition law.

220. By mandating worldwide protection of confidential information under similar regimes, the TRIPS Agreement (Article 39) creates legal bases for stimulating investment in subpatentable innovation in all countries. The protection of confidential information under the TRIPS Agreement also favours the licensing of more advanced technologies to the developing countries by reducing the licensor's risk and perhaps some transaction costs as well.

221. There is an interesting reason why trade-secrets laws involve no liability for lawful copying. Firms are at times likely to be creators of trade secrets and at other times to be copiers of trade secrets. All have a joint interest in being able to reverse engineer each other's products in order to learn underlying processes. In turn, this learning stimulates greater dynamic competition (Reichman, 1994).

222. Because all competitors want this option at different intervals of time, legal protection against reverse engineering would impose high costs on the system that, in expected value terms, could be higher for every firm than the expected costs of losing limited trade-secret protection (Maskus, 1996a). This system works well enough when learning costs are relatively high. It works less well when learning costs are quite low due to the possibility that reverse engineering could easily reveal underlying processes by trivial measures (Samuelson *et al.*, 1994). In such cases as software, computer chips and biotechnology, global standards have evolved towards statutory requirements for protection that are stronger than trade secrets but which introduce the high social costs of exclusive property rights.

223. Trade secrets may result from deliberate R & D efforts, as well as from routine activities that lead to incremental or minor innovations. Trade secrets may also partake of science-based or purely empirical knowledge, as well as of non-technical information that has commercial value. Often trade secrets are of a "tacit" nature in the sense that the relevant knowledge is not formalized or codified. Trade secrets are particularly important in fields where process innovation is a crucial aspect of competition, such as the chemical industries.<sup>57</sup>

224. The peculiarities of trade-secret law do imply certain practical limitations that investors ignore at their peril. Apart from the inherent risk of lawful reverse engineering, for example, the measures necessary to maintain legal secrecy can become costly and burdensome over time and, at the limit, they can even hinder authorized third parties from efficiently exploiting the innovation.

225. Nevertheless, the TRIPS Agreement, which mandates the protection of undisclosed information in all participating countries, puts developing country entrepreneurs under no greater a burden than that applicable to competitors elsewhere. By the same token, it entitles these entrepreneurs to the same lead-time advantages that accrue to entrepreneurs in industrialized countries, and it shields them from certain forms of unethical con-

duct within the legal framework of the Paris Convention (Article 10 *bis*).

226. To operate successfully under trade-secret laws, countries must realign the concept of "transfer of technology" with the nature of competition in open markets. From this perspective, technology is neither given away in response to altruistic promptings of foreign policy nor acquired by means that avoid contributing to the actual cost of research and development. Rather, unlicensed technology is increasingly transferred through self-help methods of reverse engineering, and the international regime of trade-secret protection would legitimize this practice against future complaints from those enterprises whose initial comparative advantages were subsequently eroded.

227. In some instances, of course, developing countries will lack the capacity to reverse engineer by proper means, and no one can deny that they face formidable handicaps in improving their national innovation profiles. But one should not overemphasize traditional handicaps associated with closed economies when assessing competitive prospects in open economies, if only because the skills needed to reverse engineer foreign technologies are usually available on the global labour market. This presents entrepreneurs in developing countries with major challenges and opportunities.

### C. Implementation

228. The language that the TRIPS Agreement (Article 39.2) uses to mandate the protection of undisclosed information resembles that of the Uniform Trade Secrets Act, which is widely adopted at the local level in the United States.<sup>58</sup> However, there is no express provision—such as that in the United States model law—that guarantees third parties the right to reverse engineer products made from secret processes by proper means. Rather, Article 39.2 merely invokes Article 10 *bis* of the Paris Convention, which would require third parties not to acquire undisclosed information "in a manner contrary to honest commercial practices." A footnote to Article 39.2 precludes "at least practices such as breach of contract, breach of confidence and inducements to breach" but does not affirmatively endorse reverse analysis as such.

229. This omission is unfortunate in view of the tendency in some countries to stigmatize honest reverse engineering as "parasitical copying". Whether a WTO panel would regard a competitor's right to reverse engineer by proper means as inherent in the "honest commercial practices" standard for purposes of dispute-settlement proceedings remains to be seen. Indeed, any weakening of this principle at the international level would compromise both the economic functions of trade-secret law and a long-standing tradition concerning the rights and duties of competitors.

230. Trade-secret laws generally cover "any formula, pattern, device or compilation of information"

<sup>57</sup> There is no necessary correlation between the social value of the innovation and the amount of protection it will obtain from trade-secret laws, which is said to be an economic shortcoming of this legal institution. For example, the first creator of the "safety pin" might obtain too little lead-time to recoup his or her investment because any third party might quickly duplicate the unconcealable functional design. That, indeed, could be the reason why such countries as Germany, Italy and Japan first enacted utility model law. Yet, the first creator of a certain popular beverage or certain hybrid seeds may obtain long or even perpetual protection in trade-secret law if third parties cannot successfully reverse engineer it in order to offer substitute products. On balance, trade-secret protection usually promotes both innovation and competition because, unlike patent law, it never withdraws applied technical knowledge from the public domain, and it does not create legal barriers to entry.

<sup>58</sup> See Uniform Trade Secrets Act 81 (4), 14 U.L.A. 438 (1985). There is no federal law in the United States regulating trade secrets.

that confers a business advantage over competitors, so long as it is sufficiently definite and not commonly known in the trade and so long as reasonable precautions are taken to preserve its secrecy. Assuming that any given innovation fits within the operative definition of "trade secret", its originator obtains no exclusive rights to make, sue, sell or reproduce it in the manner of patents. Rather, third party acquisition of secret knowledge is a violation only when obtained by improper means, that is to say in ways that are excluded by private contractual agreement or that violate a confidential relationship or that otherwise offend public policy. Trade secrets that are voluntarily revealed, insufficiently guarded or reverse-engineered lose all protection and become subject to free competition. Trade-secret law thus provides needed incentives for the development of incremental innovation not meeting the non-obviousness standard of patent law, while it simultaneously discourages industrial espionage, unethical behaviour and corruption.

231. The question of infringement logically turns to whether the second-comer used honest or dishonest means to require the innovator's unpatented, non-copyrightable know-how, and the issue falls under tort law (i.e. a liability regime), not under the laws regarding exclusive property rights. In this connection, it cannot be sufficiently emphasized that any injunction that a court happened to issue against infringer A, who had obtained the innovator's know-how by improper means, could not be extended to second-comers B, C and D, who obtained the innovator's know-how by proper means of reverse engineering. Even when innovators prove misappropriation of their trade secrets to a court's satisfaction by showing, for example, that competitor A had bribed their employees, domestic courts usually limit injunctive relief and damages to the estimated period that would have been required for reverse engineering by fair means. In other words, trade-secret law does not protect against

copying as such, but merely reinstates the lead-time advantage that a wrongful taking of a technical secret may have neutralized.

#### **D. Direct costs of implementation**

232. Ensuring protection against unfair commercial practices pertaining to the misappropriation of trade secrets does not entail direct administrative costs, as no registration or other formalities are required. Private enforcement costs may, however, be significant, particularly for small and medium-sized firms.

233. With regard to data submitted for approval of pharmaceutical and agrochemical products (Article 39.3), the obligations on Governments could raise administrative costs, for instance in terms of controlling access to certain office areas or of providing special filing methods for protected data. In addition, judicial enforcement costs may be significant, particularly because of the complexity of proof in trade-secret cases and also because there is an unresolved tension between the need to sustain employers who invest in developing secret know-how and the countervailing need to allow employees a certain freedom to carry their skills and knowledge to other firms, with corresponding spillover effects. These problems have recently become acute in the university environment (Reichman, 1992).

234. Competent authorities may adopt measures to avoid the unauthorized disclosure of secret data submitted for their consideration. These authorities are not prevented (Article 39.2) from using the knowledge of such data, for instance, to assess subsequent applications by third parties for the registration of similar products. This may avoid duplication of research costs (as well as painful and risky tests on animals and humans) and expedite the commercialization of substitute products.

## VI. INTEGRATED CIRCUIT DESIGN

235. In the past, the international intellectual property system required members of the Paris Convention to protect "industrial designs" (mainly understood in the sense of product configurations appealing to the eye or so-called "appearance designs"), but it left the protection of unpatentable functional designs to the domestic utility model laws that a few countries had enacted. Those countries that protected utility models—which originally meant small-scale functional improvements in the design of handtools or other household articles—had to confer national treatment and priority rights on the nationals of other Paris Convention countries.

236. Meanwhile, the TRIPS Agreement singles out one class of functional designs—integrated circuit designs (also known as "mask works", "layout designs", and "semiconductor chip topographies")—for detailed regulation. This topic is addressed in this section.

### A. Relevant TRIPS Agreement standards

237. In effect, the TRIPS Agreement mandates compliance with core substantive provisions of the Treaty on Intellectual Property in Respect of Integrated Circuits of 1989 (IPIC Treaty or Washington Treaty), which is not yet in force.<sup>59</sup> These provisions<sup>60</sup> obliged WTO members to prohibit unauthorized imports, sales or commercial distribution of a protected layout design, of an integrated circuit embodying such a design, or of an article incorporating an integrated circuit, for at least 10 years, subject to a good faith exception.

238. The applicable provisions combine a threshold prerequisite of originality (in the sense of independent, uncopied creation) with a loose novelty requirement that excludes commonplace or familiar designs, and they protect eligible mask works against copying only, but not against independent creation. In theory, each member country "shall be free to implement its obligations . . . through a special law on layout-designs (topographies) or its laws on copyright, patent, utility models, industrial designs, unfair competition or any other law or a combination of any of those laws" (IPIC, Article 4). In practice, all the prerequisites of the TRIPS Agreement

<sup>59</sup> "The TRIPS Agreement requires member states to protect the layout-design of integrated circuits in accordance with the provision of the IPIC Treaty, negotiated under the auspices of WIPO in 1989, together with four additional provisions that address the concerns that have made that Treaty unacceptable to many. These relate to the term of protection (ten years instead of eight), the treatment of innocent infringers, the applicability of the protection to articles containing infringing integrated circuits, and compulsory licensing" (Otten and Wager, 1996, pp. 401-402).

<sup>60</sup> Modelled largely on the United States Semiconductor Chip Protection Act of 1984.

must be met, and this peculiar combination of requirements is found in no other intellectual property regime. Of particular importance in this regard is the right of third parties to reverse engineer a protected circuit design, with a view to producing a competing design, provided that the second-comer's own design is independently created and satisfies the minimum quantum of originality (IPIC, Article 6 (2) (a), (b), incorporated by reference into TRIPS Agreement Article 35).

### B. Main implications

239. Competition with respect to integrated circuit designs has been driven by constant innovation and by a race to enter the market with new products in order to obtain "lead-time" advantages over competitors. Intellectual property rights, although potentially important, have not played a role in this industry comparable to that of IPRs in other industries (e.g. patents on pharmaceuticals), although one explanation may be that the patent authorities in developed countries are now more willing to grant patents on chip designs (despite serious doubts about induced levels of invention) than they were in the 1980s.

240. The *sui generis* protection scheme required by the IPIC Treaty (as partially incorporated by reference into Article 35 of the TRIPS Agreement) does not establish legal barriers to entry that could harm developing countries. The exclusive right of reproduction prevents competitors from slavishly duplicating a protected chip as such. But the right to reverse engineer permits reproduction for analytical use when it leads to independently created chip designs. The chip laws thus preserve an originator's lead-time against outright copying, while encouraging second-comers to abbreviate that lead-time by rapid reverse engineering and by fashioning the improvements to which it naturally leads.

241. Technical barriers to entry remain formidable, however, even if legal barriers are not. The increased complexity of chip design in recent years, the correspondingly higher costs of development and production, and the increasingly closer relations between purchasers and manufacturers all tend to limit the prospects for developing countries in this field. The reverse engineering of chip designs remains relatively more costly for firms in developing countries because they need to purchase equipment for the task and they also need to marshal the technical skills and investments required to bring a competing chip design to market.

242. The medium- and long-term implications for developing countries of implementing the TRIPS Agreement provisions on integrated circuit designs are hard to

predict. Despite the difficulties identified above, a country like the Republic of Korea has made inroads on the market. Other countries in Asia and Latin America have reportedly established some capacity for the production of custom and semi-custom chips by adopting appropriate CAD (computer-aided design) tools and by locating manufacturing outlets abroad. Other developing countries have still managed to participate in some phases of chip production (e.g. assembly) or have acquired related capabilities, such as foundry production. Nevertheless, most developing countries are, and will probably remain, net importers of integrated circuits for the foreseeable future. These imports occur in two forms, either as chips to be incorporated into other industrial products, such as computers and consumer electronics, or as industrial products that already incorporate protected chip designs. The latter imports are more important by far, and they are expressly covered by the TRIPS Agreement (Article 36).

### C. Implementation

243. Laws protecting integrated circuit designs in developing countries were initially hard to draft, but they have elicited very little litigation. Critics say this is because these laws have already become obsolete, but there is reason to believe that the lack of litigation is also because the statutory toleration of analytical use of reverse engineering use makes these laws resemble a liability regime (like that of trade-secret laws) more than a true exclusive property right.

244. Developing countries were disappointed that Articles 31(k) and 35 of the TRIPS Agreement, taken together, denied them access to compulsory licences for commercial use that the IPIC Treaty originally provided. As a practical matter, however, the right to produce comparable chips by resorting to proper methods of reverse engineering makes compulsory licences less important than in the case of patents, where the doctrine of equivalents applies and second-comers must invent around specified claims. Moreover, Article 31(k), as specifically incorporated into Article 37.2, maintains the right to invoke compulsory licences when the aim is "to remedy a practice determined after judicial or administrative process to be anti-competitive". This could help to restrain the possibility of unreasonably priced imports.

245. As noted, product simulation obtained by reverse engineering, as opposed to unauthorized duplication, should constitute as perfect a defence to an infringement action under the chip protection provisions of the TRIPS Agreement as to an action for the misappropriation of trade secrets under Article 39. In practice, however, it can happen that a second-comer who actu-

ally pays the costs of reverse engineering a protected chip design nonetheless produces a virtually identical end-product and then claims that overall technical constraints require the new and old chips to be functionally identical. This argument failed to persuade the United States Court of Appeals for the Federal Circuit in a recent case. The lesson to be drawn is that in close cases, countries implementing the chip protection laws could require a third party who reverse engineers a protected layout design to show that the allegedly infringing design enhanced the performance of the semiconductor chip products in question.<sup>61</sup>

246. It should be noted that countries may condition the protection of chip designs on both registration and actual commercial exploitation "separately or as incorporated in an integrated circuit somewhere in the world".<sup>62</sup> However, where registration is required within a fixed period of time, countries may allow the applicant at least a two-year period from first commercial exploitation anywhere before invalidating the designs on this ground.<sup>63</sup> Once again, this is a peculiar feature of the chip legal regime. In effect, they provide manufacturers with two years of *unregistered* protection against copying in which to test the market, for example, even if the chip design is not further registered or exploited. This provision will also benefit chip designers in developing countries who may need to test the market even more than manufacturers in developed countries.

### D. Direct costs of implementation

247. The costs of implementing legal protection for integrated circuit designs have been relatively low in developed countries, and this should prove true in developing countries as well. There is no rigorous examination scheme to administer, and States may allow the loose novelty requirement to be raised at trial as a defence to an infringement action without examining this issue at the time of registration.

248. However, the provisions of the Agreement (Part II, section 6), taken together, may subject authorities in countries importing industrial products containing integrated circuits to the burden of inspecting equipment, home electric devices and other goods in order to avoid liability deriving from the acquisition of infringing circuit design, even if the acquisition was made in good faith. This could prove to be a troublesome, costly and controversial requirement unless countries reach a working agreement on how to keep such costs under control.

<sup>61</sup> See *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d (pp. 1569-1570).

<sup>62</sup> Article 7.1 of the IPIC Treaty.

<sup>63</sup> See Article 7.2 (b) of the IPIC Treaty.

## VII. INDUSTRIAL DESIGN

249. The protection of industrial designs under the TRIPS Agreement (Articles 25 and 26) pertains normally to non-functionally-determined appearance designs, especially the aesthetic aspects of product configurations. While all countries may benefit from the availability and enforcement of design rights, their economic importance varies considerably across different branches of industry. They play a significant role in such sectors as clothing, automobiles, electric appliances and furniture, among others. Competition influenced by appearance designs also occurs in innovation-intensive sectors and even in sectors where mature technologies predominate.

### A. Relevant TRIPS Agreement standards

250. There is no real consensus among developed countries about how best to protect commercial designs, despite some 200 years of national experimentation, and this is reflected in the fact that, until the advent of computer programmes, industrial designs (otherwise known as “applied art”) were virtually the only subject-matter covered by both the Paris and Berne Conventions. Given the continued lack of international consensus concerning the proper means of protecting industrial designs, the TRIPS Agreement leaves participating States relatively free to draft domestic design protection laws with local objectives in mind. Although members must provide some form of design protection to satisfy both the TRIPS Agreement provisions and the Paris Convention (Article 5 *quinquies*), countries may resort either to an industrial property law or to copyright law for these purposes, and they need not protect functionally determined designs at all. Members must protect textile designs, however, either in a design law or in copyright law, and if *sui generis* laws are adopted for this or other purposes, they must protect appearance designs against copying for at least a ten-year period.

251. Nothing in the TRIPS Agreement provisions thus determines whether a country should adopt modified patent, modified copyright or modified liability principles. Japan has recently moved to protect unregistered designs in an unfair competition regime (i.e. on liability principles) for a period of three years, in addition to its registered design law. However, the TRIPS Agreement (Article 25) limits the eligibility requirements of any given *sui generis* system to “independently created industrial designs that are new or original”. This would seem to render the few remaining design patent regimes inconsistent with the TRIPS Agreement to the extent that they require application of a true non-obviousness criterion.

### B. Main implications

252. Because the TRIPS Agreement leaves Member countries ample room to determine the kind of design protection regimes they want, the economic implications of the relevant provisions will vary with the nature of the scheme adopted. In this context, comparative law reveals numerous models that may or may not be of interest to the developing countries (Reichman, 1989 and 1984). Considering that developed countries have at various times experimented with all these regimes without finding any of them satisfactory, developing countries should look to their own interests and view the existing models critically.

253. Studies show that all experiments—from full patent protection to full copyright protection to various *sui generis* models in between—have, over the decades, revealed a recurring cyclical pattern that swings back and forth between chronic states of underprotection and (chronic states of) overprotection. In other words, “chronic underprotection in industrial property laws leads to chronic overprotection in artistic property law, which in turn inspires further reactive reforms of industrial property law tending to reinstate levels of underprotection that will foster renewed appeals to copyright law” (Reichman, 1994, p. 2464, giving examples and citing authorities). The lesson for the developing countries is that they should move towards competitive models.

### C. Implementation

254. The technical shortcomings inherent in every known form of *sui generis* design protection are well known to specialists, and their detailed discussion is beyond the scope of this report. As noted above, the problem facing policy-makers is not primarily one of technical legal considerations, but rather of deciding the goals that each given country’s design law should aim to fulfil. Policy-makers should bear in mind that residual provisions of the Paris Convention will still apply to designs protected under *sui generis* industrial design laws and that residual provisions of the Berne Convention will still apply to all designs protected as “applied art”. Indeed, the Berne Convention requires that there be at least some possibility of protecting certain industrial designs as works of applied art. Maintaining the line of demarcation between non-copyrightable industrial design and copyrightable applied art has proved to be a daunting task everywhere (except, perhaps in Italy, which traditionally avoids copyright protection of commercial designs in almost any form other than purely representational art). In this connection, countries will also have to

decide whether to protect textile designs under copyright law or in a *sui generis* design law, although the latter is more logical and makes greater economic sense.

255. As noted elsewhere in this report, the need for local incentives for innovation will also require developing countries to consider protecting functional designs (or other minor industrial creations) either under utility model laws or under some other type of law, including the possibility of *sui generis* laws built on modified liability principles. Once again, this topic lies beyond the scope of the present study and will require further investigation. For present purposes, nonetheless, it bears reiterating that the TRIPS Agreement seldom limits the options in this respect. Meanwhile, exporters in both developed and developing countries should note that compliance with the requirements of domestic design laws provides no guarantee against infringements of domestic design rights based on different criteria in other countries.

#### D. Direct costs of implementation

256. Pursuant to the above analysis, transaction costs will vary with the type of regime adopted. The highest costs clearly pertain to those regimes that require an examination system, which some countries insist on retaining despite the weight of contrary scholarly opinion. If for no other reason than to avoid useless and counter-productive transaction costs, developing countries might not require an examination system when devising their design protection regimes. This, in turn, makes "copyright-like" design laws seem more suitable than "patent-like design laws", and there are other sound economic reasons for such a choice. The transaction costs of liability regimes should also be very low, but empirical evidence is lacking in this regard. It should be remembered that countries can admit parallel imports and can resort to competition law if such measures are necessary to remedy practices that adversely affect local consumers.

## VIII. COMPETITION ISSUES WITHIN THE TRIPS FRAMEWORK

257. As noted above, the analysis of competition issues in this section, owing to the nature of the subject-matter and its treatment in the TRIPS Agreement, follows a slightly different format than that of the discussion on the specific IPR disciplines above. This section discusses general aspects of competition policy and its interface with intellectual property rights and the approach taken in the TRIPS Agreement to anti-competitive practices and their control, as well as issues of implementation, administration and enforcement.

### A. The TRIPS Agreement's approach to general anti-competitive practices

258. Exploitation of intellectual property rights could give rise to the possibility of anti-competitive behaviour, whether by individual firms or by concerted practices or agreement among firms. An adequate definition and implementation of public policies to deal with this problem represents one of the most important criteria for the efficient functioning of any intellectual property system. Intellectual property laws aim at conferring exclusive rights to individuals, not as monopoly rights but as property rights allowing the owner to appropriate for himself the full market value of the protected subject-matter, but no more than this market value. By promising that the owner of an intellectual property may obtain his full reward from the market, IPRs serve both as an incentive for the creation, use and exploitation of inventions, works, marks and designs and as a stimulus to competition in a well functioning, free market economy. Consequently, competition and IPRs should normally not be seen as contradictory, but rather as interdependent elements. This means that the efficiency of the intellectual property system is at stake whenever competition is distorted or artificially restrained. Moreover, only a fully competitive market is likely to minimize the social costs resulting from the fact that intellectual property protection cannot be adjusted to individual needs. Rather, it must operate on general principles with over or underprotection being unavoidable at times, as discussed in part one.

259. Competition policy is not intended to correct this general and abstract operation of the intellectual property system. But in safeguarding the efficient functioning of the market in general, it will also deal with conflicts which may arise between the competition system and, in particular, IPRs. There are three types of conflict. First, intellectual property may be used contrary to the objectives and conditions of its protection—a situation called misuse. Second, existing market power or market power resulting from intellectual property may be used to extend the protection beyond its purpose or, con-

versely, the exclusive right may be exercised to enhance or to extend or abuse monopoly power. Third, agreements on the use or the exploitation of intellectual property may be concluded in restraint of trade or limiting the transfer or the dissemination of technology or other knowledge—a situation called restrictive contracts or concerted practice. In order to prevent or control such conflicts and to distinguish the pernicious ones from the ultimately beneficial practices, most countries have enacted antitrust or other legislative acts on some or all of the possibly anti-competitive practices. The approaches depend on the particular conditions of national markets, national legal traditions, and on public interest. Competition rules are not designed to curb the functioning of the intellectual property system, but rather to safeguard the proper operation of IPRs. In this way it becomes possible to obtain all the benefits IPRs may yield when placed in the context for which they were conceived, namely a competitive market economy (see also Ullrich, 1995).

260. It is necessary for developing countries to formulate the appropriate legal and economic responses to anti-competitive practices arising from abuse or misuse of IPRs. They can tailor applications of their competition law as desired for this task, subject to general requirements in the TRIPS Agreement. Caution is in order, however, because overzealous use of competition law can increase uncertainty and limit incentives for investment, including by local firms, which, in turn, could also raise contracting costs in technology agreements. Again, a balance must be struck between promoting market incentives and the need to limit monopolistic and unfair business practices.

261. The TRIPS Agreement addresses issues of competition, but rather than settle them directly, it refers the matter to national law as regards both policy determination and implementation. Thus, it allows Members to take, if needed, "appropriate measures, provided that they are consistent with the provisions of this Agreement, . . . to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology" (Article 8.2). As this provision, which relates to all intellectual property covered by the TRIPS Agreement, is set out under the heading of Principles and as it forms part of Part I (General Provisions and Basic Principles), it must be construed broadly. Thus, it gives effect not only to the provisions of the Agreement, but also to its objectives, namely the reduction of distortions and impediments to international trade and the avoidance of barriers to legitimate trade.

262. In this respect, it is important to note that the Agreement, in Article 8.2, addresses three different kinds of practices: first, the abuse of intellectual property

rights by the right holder independently of any market power he may enjoy (Heinemann, 1985); second, practices which unreasonably restrain trade; and third, practices which adversely affect the international transfer of technology. The latter two categories, which include both unilateral conduct as well as concerted conduct (abuse of monopoly power and contracts restricting trade or technology transfer), must be distinguished. There are restrictive practices which do not affect transfer of technology, such as copyright distribution contracts or delimitation agreements regarding trademarks. Conversely, it is less clear whether there exist practices adversely affecting technology transfer that do not also unreasonably restrain trade. This question is important, as it has not been settled by legal opinion and because it points to the problem of conflicting goals of competition policy. For example, safeguarding competitors and efficiency of transactions may contradict other public policy interests, such as industrial development. Most industrialized countries tend to equate both issues, whereas some developing countries tend to deal with them separately or to deal only with the issue of technology transfer, rather than with that of competition (see UNCTAD, 1995a).

263. In any event, the Agreement (Article 8.2) seems to allow technology transfer control as such. Thus, unilateral practices adversely affecting technology transfers by enterprises not enjoying market power or intra-enterprise transactions between parent and affiliate companies may be controlled, as the TRIPS Agreement clearly distinguishes between those practices which restrict competition and those which affect technology transfer. Moreover, Article 8.1 expressly authorizes Members to promote the public interest in sectors of vital importance to their technological development. Article 8.2 may not be presumed to outrule a measure that Article 8.1 expressly allows, at least within certain limits.

264. There are, however, also limits to the exercise of control over both the misuse of intellectual property rights and practices that unreasonably restrict competition or adversely affect technology transfer. Indeed, Article 8.2 only allows those measures which are appropriate, consistent with the TRIPS Agreement's provisions and needed to prevent such misuse or such practices to be taken. This means that national control of anti-competitive and related practices must meet some sort of *proportionality test* in order to be acceptable under the TRIPS Agreement. Indeed, competition policy may not be used to undermine the TRIPS Agreement's protection of intellectual property by overly broad concepts of restrictive conduct or by excessive remedies.<sup>64</sup> The proportionality test therefore means that the measures of control must be suited to preventing anti-competitive conduct. The proportionality test leaves, however, a large margin of application to Member countries, since it is their role to determine what represents an abuse of intellectual property rights, an unreasonable restraint of trade or an adverse effect on technology transfer. The criteria of appropriateness and necessity need implementation and will take on more precise meanings only gradually as the principle is actually applied.

<sup>64</sup> An example of the proportionality requirement is given by Article 31 of the TRIPS Agreement.

265. In this context, two points are noteworthy. First, the Agreement (Article 8.2) applies only to "trade" and to "international" technology transfer, thus leaving purely domestic practices to the sovereign control of Members. Secondly, it applies only to anti-competitive conduct related to IPRs, not to anti-competitive conduct in general. Consequently, control of the exercise or the exploitation of IPRs that forms part of a broader and distinct restrictive practice or agreement (such as joint ventures, bid-rigging, or distribution agreements) is not covered by the TRIPS Agreement. In this context, it may be noted that under the laws of countries with a long-standing antitrust law tradition, agreements among competitors (so-called horizontal agreement), including price-fixing and market divisions, are subject to general principles of antitrust policy even if they imply the use, acquisition or licensing of intellectual property. Examples include cross-licensing and patent policy. Similarly, the abuse of market power is not normally excused by the existence of intellectual property protection where the conduct is due to the factual market power and independent from intellectual property protection. Examples include refusals to supply non-protected products, discriminatory or predatory pricing, and most tie-ins.

#### B. Control of anti-competitive licensing practices and conditions

266. The TRIPS Agreement deals more specifically with the control of anti-competitive practices in contractual licences (Article 40.1). It does not spell out which practices come under this principle. It does no more than confirm the concept of controlling such practices. It makes it clear that "nothing in this Agreement shall prevent Members from specifying in their legislation licensing practices or conditions that may in particular cases constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market" (Article 40.2). It allows Member countries to "adopt, consistently with the other provisions of this Agreement, appropriate measures to prevent or control such practices . . . in the light of the relevant laws and regulations of that Member". It also gives examples of such practices, including exclusive grant back conditions, conditions preventing challenges to validity, and coercive package licensing. Accordingly, the Agreement does not cover all the misuses of intellectual property rights nor all the practices coming under the general authorization principle of Article 8.2. Rather, it is limited to those licensing practices that exemplify the practices envisaged in Article 8.2. Restrictive practices or practices affecting technology transfer that occur outside a licensing context, such as delimitation agreements, assignments, intellectual property clauses in research and development contracts or in cooperation agreements, joint ventures and subcontracting arrangements, as well as all unilateral conduct by enterprises enjoying some sort of market power, are not subject to Article 40.

267. In fact, the examples given represent only the tip of the iceberg as regards practices that are usually considered to be critical under national antitrust laws and do not even exhaust the list of "abuses" that normally

are considered to be *per se* unlawful. On the one hand, non-challenge clauses are held valid or at least redeemable under some national laws.<sup>65</sup> On the other hand, practices such as vertical restrictions limiting the exhaustion of an intellectual property right, restrictions on sales or on resale prices, and restrictions on customers are not mentioned although they are outlawed by most antitrust laws. The examples given by Article 40.2 are therefore indicative of the intent of the framers of the TRIPS Agreement to leave the specification of unlawful conduct to members.<sup>66</sup>

268. The only limitation for legislative discretion beyond the proportionality test referred to above is that Members may not generally outlaw certain licensing practices or conditions, but rather must determine the "particular cases" in which a given practice amounts to an abuse. The purpose of this qualification is obviously to prevent the enactment of licensing rules which a priori outlaw some forms of licensing without any specification as to their anti-competitive or otherwise detrimental nature. It is doubtful whether, due to this condition, Article 40.2 stands in the way of legislating or developing *per se* prohibition rules. It can hardly be meant to exclude the elaboration of specific *per se* rules that form part of the traditional antitrust enforcement used by some countries, and it certainly cannot hinder the establishment of black lists of clauses that, in principle, do not qualify for an antitrust exemption but which still allow for a showing of reasonableness in the circumstances of a particular case.<sup>67</sup>

269. Countries seem to be bound by an obligation to afford some minimum control over restrictive practices which, according to traditional principles, unreasonably restrain competition or adversely affect trade.<sup>68</sup> The implementation of the TRIPS Agreement implies the gradual development and mutual understanding of at least the basic principles of what are generally unacceptable restrictive practices in the field of intellectual property (Fox, 1996).

### C. Implementation

270. When formulating an intellectual-property-related competition policy, Member countries will face a particularly complex task. First, the areas that may have

<sup>65</sup> See German Act Against Restraints of Competition and Regulation 240/96 of the Commission of the European Communities on the application of Art. 85 of the Treaty of Rome to certain categories of Technology Transfer Agreements (O.J.E.C. 1996, L.31.2).

<sup>66</sup> In this respect, it should be noted that the examples are not even definitely classified as "abuses", although Article 40.2 uses this qualification, since it is only said that they "may" constitute such abuses. Moreover, Article 8.2 not only allows the control of "abusive" conduct, but also allows control of any practices that are found to be "unreasonably" restrictive or that "adversely" affect the transfer of technology.

<sup>67</sup> See, for example, the approach in Art. 3 of European Commission Regulation 240/96, cited above.

<sup>68</sup> The need for control of restrictive practices at a worldwide level has been felt by many. It has led to bilateral cooperation between countries (United States of America and Germany, United States of America and EU) and to academic endeavours to prepare an international set of antitrust rules (Fox, 1996, p. 481).

to be covered are rather broad and heterogenous, as both the nature of IPRs and the markets in which they operate vary widely. Patent licence restrictions do not raise the same problems as trademark licences (for example, franchise agreements) or copyright licences (for example, software licences for computer work stations) and patent pools are certainly different from collecting societies for copyright royalties.

271. Furthermore, there is no internationally accepted concept for formulating a competition policy with respect to restrictive practices concerning the use of intellectual property rights. On the one hand, some members have legislated antitrust rules specifically applying to intellectual property (for example, Germany, paras. 20, 21 of the Act Against Restraints of Competition) while others have no specific rules (for example, France) or have specific rules developed on the basis of rather broad antitrust principles (for example, United States on the basis of the Sherman Act; the European Union on the basis of Article 85 of the Treaty of Rome). Even where specific rules exist, they mostly cover only some types of intellectual property (paras. 20, 21 of the German Act Against Restraints of Competition covers only industrial property, not trademarks or copyrights; Reg. 240/96 EC-Commission covers only technology transfer agreements). Thus, the antitrust treatment of the categories of intellectual property that have not been dealt with is controversial or settled only in part by case-law.

272. On the other hand, there are large differences in the fundamental approaches to intellectual-property-related restrictive practices. Germany basically follows the scope of the exclusive right approach combined with a reasonable reward approach, which allows all restrictions which are inherent in the exclusivity of an IPR or justified by a legitimate reward interest, but no further restrictions. In the United States, where courts still seem to adhere to similar concepts, antitrust authorities now follow the principle of dealing with intellectual property as with any property.<sup>69</sup> Actually they seem concerned mainly with restrictive practices agreed upon between competitors (so-called horizontal restraints). The European Union, by contrast, stresses the need to control vertical restraints as well, such as territorial, quantity or customer restrictions imposed upon licensees or agreed upon between them or with the licensor respectively. The differences are considerable both in theory and practice. The "inherency" doctrine assumes priority of intellectual property law over antitrust law in that the particular circumstances of contractual intellectual property exploitation are neglected, at least as regards territorial, quantitative and qualitative restrictions of use. By contrast, the United States and the European Union approaches basically seek to harmonize the interests of intellectual property protection and antitrust law in cases of specific conflict but they both define the conflict areas differently. The United States is concerned with restraints agreed upon between competitors (risk of collusion and shared monopoly), and the European Union aims at controlling agreements with non-competing

<sup>69</sup> See United States Antitrust Guidelines for the Licensing of Intellectual Property (6 April 1995) issued by the United States Department of Justice and the Federal Trade Commission.

licensees (vertical agreements) which may result in a partitioning of the Common Market or in frustrating consumer interest in the free choice of suppliers (see Fox, 1996, p. 486, and UNCTAD, 1995b).

273. Finally, in addition to the antitrust concerns over bilateral agreements between firms on the exploitation of intellectual property, complex issues may arise in cases of multilateral cross-licensing, the establishment and operation of joint ventures (especially research and development joint ventures) by competing or potentially competing enterprises, delimitation agreements, and the unilateral exploitation of intellectual property by market-dominating enterprises.

274. Thus, at the domestic level, the interface of antitrust law and IPRs has become a highly elaborate and specific area of competition law. It requires mastery of both general antitrust theory, such as the concepts of restriction, relevant market and market power, and intellectual property law. This complexity by itself and continuing divergence of views as to the relationship of intellectual property and competition explain why this area of the law has developed differently in various countries and why its application and enforcement pose so many problems. In addition, there are fundamental differences as regards the goals of antitrust. In the United States the market is unitary and the main goal has been to ensure efficiency of market operations. The European Union (EU) is not only concerned with the integration of national markets into one unitary market but also with maintaining consumer choice regarding suppliers (intra-brand competition) and enhancing European competitiveness (industrial policy goals like intra-Community technology transfer or R & D cooperation). These two last goals may at times be in conflict.

275. Similarly, the competition policy that Member countries may wish to follow will be influenced by national particularities regarding the structures of domestic industries and markets or adherence to common markets or free-trade areas. Thus, the countries belonging to a common market tend to adapt their national competition policy to that of the common market, as actually occurs in the EU. Moreover, free trade areas may require harmonized national competition rules, especially when they represent a last step to full membership in a common market, which makes adoption of its antitrust policy a prerequisite to entry, as is the case with the EU as regards Eastern European countries.<sup>70</sup> Even more important is the fact that the policy goals of national antitrust laws may include market access guarantees or industrial policy objectives so as to favour small industry or the desire for international competitiveness.

276. Other factors may influence the formulation of competition policy as well. Thus, where markets are partially regulated, as with price control for pharmaceuticals as a matter of national health care, or where there exists specific administrative control of collecting societies or where the exercise of intellectual property is subject to a

system of licences of right (for example, production of music records subsequent to the grant of a first production licence) or to compulsory licensing (for example, for non-use or patent dependency), competition policy will have to address different problems than in a situation where the markets are totally deregulated or where the exercise of intellectual property rights is unlimited.

277. In sum, any implementation of the TRIPS Agreement by substantive rules of competition policy must take account of a large number of complex factors, such as national and international market conditions and interdependencies and the goals and structure of national intellectual property (including its built-in competition rules such as experimental or fair use, exhaustion, patent or copyright misuse defences, and so on) (Ullrich, 1995). Other issues include the specific objectives of national antitrust policy, the adherence of members to international economic organizations, and the impact the TRIPS Agreement itself has on the condition of competition. This is certainly no easy task and not one that can be complied with by simple and hasty legislation. Rather this is a complex and time-consuming endeavour with objectives and emphases changing over time. This is one of the great challenges posed by the TRIPS Agreement to developing countries.

#### D. Issues of administration and enforcement

278. Administration and enforcement of a competition policy regarding intellectual property protection does not raise issues that are fundamentally different from those arising with respect to the administration and enforcement of any competition policy. Accordingly, only a few points need to be stressed here.

279. First, effective administration and enforcement of an IPR-related competition policy appear to be particularly important as, in view of the interdependency of intellectual property protection and competition, the costs of non-enforcement may be high. Where the efficient functioning of IPRs is impaired by restrictive practices, the market-oriented incentives decline and social costs rise. In this respect, a well-balanced design of intellectual property laws as regards, for example, exceptions for prior users, experimental or fair use, non-protectionist working requirements and misuse defences, may help both to unburden competition policy and encourage private action against undue claims for protection. Similarly, control of restrictive practices should be armed not only with administrative or penal sanctions, but also with private remedies such as nullity of restrictive agreements, right to cancellation, and damages.

280. Secondly, the systems of antitrust enforcement generally vary as to the approach taken to distinguishing legitimate conduct from anti-competitive conduct. A general feature is that the authority to control business conduct as to its possibly anti-competitive effects must be defined in broader terms than the conduct itself, which ultimately might be banned because of its detrimental nature. However, whether such control is exercised mandatorily *ex ante* by subjecting certain types of agreements to a notification or authorization requirement (for example, Germany, EU) or whether it is exercised

<sup>70</sup> This raises the issue of regional block-building of antitrust concepts that may complicate rather than facilitate international understanding due to the rivalry of approaches. Academic efforts to define international antitrust concepts still await general acceptance (see Fikentscher, 1995).

only *ex post* on the basis of an authority to invalidate existing agreements (for example, in part in the United Kingdom) is a matter of national administrative tradition, administrative experience and capacity. Similarly, only national legal tradition determines whether antitrust rules that outlaw anti-competitive conduct by simple operation of the law are acceptable (for example, Sect. 1, 2 of the United States Sherman Act).

281. The main difference among these various approaches, all of which may be effective or ineffective depending on how they are actually implemented, is in the varying degree of legal certainty they provide for both enterprises indulging in possibly anti-competitive conduct and their competitors. Authorities in Member countries may specify by regulation, notice or administrative guideline the conduct which is held or presumed to be lawful or unlawful. The legal character of such administrative regulation or guidance differs, however, and these instruments of control do not allow authorities to dispense with actual investigation into the conduct of enterprises. Guidelines are necessary, at least with respect to certain standard market transactions, but their development requires experience of control and their issuance necessitates follow-up control by individual investigation. The important point under the TRIPS Agreement is that it neither prescribes nor excludes any specific form of control and clearly allows countries to introduce preventive control, for example by establishing notification and authorization requirements (see particularly Articles 8.2 and 40.2 of the Agreement).

282. Thirdly, the complexities of the application of substantive rules-of-competition policy relating to intellectual property mean that effective and legitimate control requires specialized and experienced enforcement bodies, both administrative agencies and courts. The task of distinguishing between restrictive practices or an abuse of market power and a reasonable practice to correct problems of risk management will require consider-

able expertise. Most Member countries provide for some administrative control by either advisory or enforcement agencies, whereas courts hear appeals about such agencies' decisions or direct actions by private parties. They may be courts of general jurisdiction or specialized jurisdiction, depending on national tradition. As regards specialized courts, it is important that they have experience in both competition matters and intellectual property law.

283. The establishment of enforcement agencies alongside private enforcement by action of competitors or dissatisfied parties to a restrictive agreement may entail considerable costs that may not, as in civil antitrust proceedings, be distributed between parties (although some of the costs may be compensated by charging them to enterprises violating the antitrust rules either as enforcement expenses or as fines levied on anti-competitive profits). But such administrative costs must be assessed in the light of the social costs resulting from non-enforcement. Experience shows that private enforcement of antitrust rules normally remains incomplete, both in general and in the specific area of the exercise of IPRs, so that administrative control is crucial for the effectiveness of competition policy.

284. As regards the issue of the extraterritorial effects of national enforcement of competition policy, the principle of proportionality, as set out in Article 8.2 of the TRIPS Agreement, arguably might also be applied as a limit to such enforcement if this results in jeopardizing other Members' IPRs and competition policy. Such limitation of extraterritorial enforcement might be superior to the general conditions that public international law has developed or is about to recognize in this respect (for example, substantial affectation of domestic markets, comity requirements, etc.). However, it may also tend to frustrate those wishing to pursue strict antitrust enforcement as a matter of public policy. Closer examination of the issue therefore appears to be warranted.

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## ANNEX 1

### IMPACT OF INTRODUCING PHARMACEUTICAL PRODUCT PATENTS

The specific case of the effects of changes in pharmaceutical patent protection has been addressed by a number of studies, both before and after the adoption of the TRIPS Agreement. It should be noted from the start that it is difficult to isolate the "patent effects" from effects stemming from eventual changes in other variables, such as income distribution, health policies (particularly with respect to acquisition of medicines) and consumption patterns.

In the pre-TRIPS period, Nogués estimated consumer costs in developing countries and found that the introduction of pharmaceutical patents would entail significant welfare losses and income gains to patent owners (Nogués, 1990, 1993). Similar results were reported by Challú (1991) for Argentina.<sup>1</sup>

In recent years, the impact of the introduction of pharmaceutical patents was also the subject of an empirical analysis in the Republic of Korea (Kim *et al.*, 1994). The study found that changes in IPR policy "created a market loss for most (pharmaceutical) firms but a gain for those with more technological capability" (*ibid.*, p. 128). This is one of a number of studies that addresses the possible impact of the introduction of patents on the local pharmaceutical industry.

Another author who has examined the possible impact of introducing pharmaceutical product patents in small and large countries and in cases where either a perfectly competitive market or Nash-Cournot duopolistic market becomes a monopoly under patents is Subramanian (1995a). Subsequently, he applied this model to the Asian countries (India, Indonesia, Pakistan, the Philippines and Thailand) that have made or would have to introduce changes requiring protection of pharmaceuticals (Subramanian (1995b)).<sup>2</sup> His second study investigated annual price, welfare and profit effects consequent upon the TRIPS Agreement for these countries. Welfare and price effects were found to be negative, although given the transitional period provided by the Agreement and the extensive time required for the approval of a medicine, the effects would be felt 20 years hence. Price effects were calculated for four different scenarios, taking into account the initial competitive duopolistic market structure and different price elasticities and assumptions with regard to the share of patented drugs in the total market of each country. Price increases estimated for patented drugs ranged from 5 per cent to 67 per cent.<sup>3</sup> Annual welfare losses for India ranged between US\$ 162 and US\$ 1,261 million, and annual profit transfer to foreign firms was estimated between US\$ 101 and US\$ 839 million (Subramanian, 1995b, p. 28). Watal (1996, unpublished) also concludes that, from an analysis of detailed market data on patentable drugs in the pre-product patents stage in India, such markets are already highly concentrated and that a move to monopoly position would entail additional welfare losses in the order of US\$ 33 million (based on 1993 estimates) and an average increase in price of about 52 per cent.

The same methodology, applied by Chambouleyron (1995) for Argentina, also indicates significant price increases (71 per cent) and a fall in consumption (50 per cent) when monopoly follows a competitive situation and a 16 per cent price increase and 25 per cent output decline respectively in the case of a duopolistic-monopoly scenario (*ibid.*, pp. 163-164).

A number of studies have also examined the impact of introducing pharmaceutical product patents on R & D expenditures, both domestic and global. In the case of Argentina, Nogués (1990) found no reason to expect an increase in domestic R & D in pharmaceuticals due to the recognition of product patents, because the development of new chemical entities would be outside the reach of local companies.<sup>4</sup> It should be noted that in this regard, Evenson (1990) found that IPRs could play a significant role in promoting "adaptive" innovations in sectors such as agriculture.

Recently, Scherer (1996, unpublished) explored the impact of the extension of patent protection on R & D activities undertaken by transnational drug companies. According to his analysis, less developed countries "might be better off if the extra profits conveyed to drug firms led to the development of more new drugs and hence to a multiplication of consumers' surplus".

From a perspective of international investment, Redwood (1994) found that in the case of India: (a) approximately 50 per cent of branded drugs that are marketed by the ten Indian-owned drug firms owe their early launch to the Indian Patents Act 1970 which does not cover patents for pharmaceutical products; (b) lack of patent cover and low profitability are mainly responsible for the fact that the pharmaceutical private sector spends only 1.5 per cent of sales on R & D, with Indian companies spending slightly more than transnationals in India; (c) taking into account the transitional period of the TRIPS Agreement, there will be absolutely no impact on prices of new patented drugs on the Indian market during the 1990s and only minimal effects during the period 2003-2005; (d) not more than 15 per cent by value of the Indian market will be covered by patents some time after 2005, and the remaining 85 per cent of the market will continue to be exposed to the full impact of generic competition, to which patented products will themselves ultimately contribute when their patent expires; (e) no significant effect can be anticipated until after 2005, because the weight of patented drugs will be too small for economic impact; and (f) price control can stop a "price explosion" at any time, but according to the author, the rationale for its continuous use is dubious and, in the context of premium pricing for patented drugs, basically unnecessary.

Similar conclusions were reached in a study carried out in Brazil (Redwood, 1995), where it is concluded that "the 'cost-to-Brazil' of lost differentials between pioneer brands and copies is unlikely to exceed an estimated 5 per cent of the value of the market segment that would eventually be patent protected . . . Adding 5 per cent to the 'patented' share of the pharmacy market would increase the 'patented' segment to 14.2-16.3 per cent, say 15 per cent, of pharmacy value, including the price premium".

Finally, another recent study by Scherer and Weisburst (1995) on the impact of patents in Italy since 1978 on R & D expenditures and new product introductions found that drug product patenting exhibited a strong upward trend well before the change in the patent regime and that after 1977 there was a statistically significant upward jump in the number of Italian patents received per US dollar of R & D outlays (due to increased patenting abroad). They also found that "Italy's patent regime change apparently had little or no impact on the trend of inflation-adjusted R & D expenditures" (*idem.*, p. 1020). They did not find an impact on the introduction of new chemical entities (*idem.*, pp. 1020-1022).

<sup>1</sup> However, the results from these studies are challenged by other authors; see, for example, Rozek (1993). For an analysis of the pharmaceutical sector in Chile, see Coloma *et al.* (1987) and Paredes (1994).

<sup>2</sup> The case of India is examined by Karandikar (1994).

<sup>3</sup> The figures are higher if the pre-TRIPS market is assumed to be perfectly competitive.

<sup>4</sup> See also Scherer (1996, unpublished).

## ANNEX 2

### IPRs AND PLANT VARIETIES—IMPLICATIONS OF PLANT BREEDERS' PROTECTION: THE CASE OF FIVE LATIN AMERICAN COUNTRIES

Plant varieties are to be protected either by patents or by an effective *sui generis* system of plant breeders' rights (PBRs) (Art. 27 of the TRIPS Agreement). The PBR (or plant variety protection-PVP) system is in use in most OECD countries, as well as in some developing countries. In early 1995, 27 countries had PBR legislation enforced and were members of the International Union for the Protection of New Varieties of Plants (UPOV). Apart from these countries, Zimbabwe and Chile also have an operational PBR system.

Even though the PBR system is being considered by many countries, it is controversial. Private seed firms advocate PBRs because it would stimulate innovation in plant breeding. Others, among them non-governmental organizations in agriculture and in biodiversity conservation, argue that PBRs may hamper the seed supply to farmers and may diminish genetic diversity. A notable problem in solving the controversy is that empirical evidence on the impact of PBRs is lacking.

The absence of evidence was the reason for the Inter-American Institute for Cooperation on Agriculture (IICA) and the University of Amsterdam to initiate a study, which was financed by two development organizations: the Special Biotechnology Programme of the Directorate General for International Cooperation (DGIS), the Netherlands, and the International Development Research Centre (IDRC), Canada. The study examines the expected impact of plant breeders' rights in respect of private investments in plant breeding, plant breeding policies of public institutes, international transfer of plant material and the diffusion of seed among farmers.

Case-studies were conducted in Argentina, Chile and Uruguay, which are among the very few developing countries with experiences in PBR protection, as well as Colombia and Mexico, two countries which were about to introduce PBR legislation.

#### 1. Private investment in plant breeding

In three of the five countries, Argentina, Chile and Uruguay, specific PBR authorities have been enforcing the law for some time. But Argentina is the only country in Latin America where PVP has been effectively enforced for a number of years. Since 1990, the breeders have actively controlled the seed market and have attempted to reduce unauthorized seed trade. Around 45 seed companies and institutes, both domestic and foreign, are presently members of a newly formed plant breeders association, named ARPOV. The predominant effect of the collective control by breeders and by the newly established PBR authority has been a considerable reduction in the unauthorized marketing of seeds of protected wheat and soya bean varieties. The share of seed supply that is now controlled by the breeders has increased to a total of 55 per cent for wheat and 40 per cent for soya bean. These figures come close to the achievements of breeders in the United States of America. To date, the domestic Argentine seed industry has been the main beneficiary of the PBR system mainly because of the dominance of the wheat and soya bean seed markets by local companies and a public agricultural institute.

The experience with PBRs in Argentina, Chile and Uruguay indicate that adequate implementation of PBR legislation requires specialized capabilities as well as specific institutional and legal strategies, such as:

a. A structure that has proven to be capable of controlling the seed market. It is difficult to conceive that PBR protection can be implemented in countries where such a structure is absent;

b. An adequate system of variety registration recognized by the seed industry; and

c. Initiatives by breeders to exercise their rights collectively. PBRs are private rights and it is up to the breeders themselves to enforce these rights. Absence of collective action by title-holders has been an important cause of the limited effect of PBR protection in Chile and Uruguay.

#### 2. Plant-breeding policies and germplasm access of public institutes

Although PBR legislation has the explicit goal of stimulating *private* plant breeding, the preliminary evidence indicates that PBR protection also supports public institutes. In all five Latin American countries, national public agricultural research centres are by far the main plant-breeding organizations. These centres used to release their new varieties at a low price or free-of-charge among farmers, and they also licensed out their varieties to the private sector on a non-exclusive basis. But budget reductions, in combination with the knowledge that the private sector was benefiting from their work, made the institutes try to retain the commercial benefits of their work. The main centres in the five countries protect all their new varieties under PBRs or are intending to do so as soon as the law offers them such an opportunity. They consider PBR protection an important tool to defend their existence and to remain competitive *vis-à-vis* the private sector. This more commercial orientation has not yet had an impact on the public sector plant-breeding agenda. At the time of the survey, none of the institutes had a formal programme in which marketing and breeding objectives were integrated.

#### 3. International transfer of plant material

One of the objectives of enacting PBRs in the Latin American countries has been to promote the import of foreign germplasm, i.e. modern cultivars, special genetic stocks, and genomic material. The recognition of property rights to germplasm makes it less risky for foreign germplasm holders to license their material to other countries. However, the role of PBRs in the international transfer of germplasm must not be overestimated. PBRs play a role in two stages of technology transfer: (a) the physical access to plant material, and (b) the exploitation of this material. Whether PBR protection improves the transfer of foreign genetic material depends on the intellectual property protection policy of the supplier.

Offering PBR protection is likely to improve *access* to germplasm that is concentrated with private seed companies in OECD countries. For example, PBRs seem to facilitate the access of Latin American companies to breeding lines of grain hybrids, or high-quality propagating material of ornamental or fruit varieties from American or European seed companies. But major public suppliers of grain germplasm, such as the international agricultural research centres, are not in a position to provide legal protection for their plant material. An operative PBR system will consequently not improve access to the genetic material available at these centres.

#### 4. The diffusion of seed among farmers

The impact of PBRs on individual farmers depends on the way these farmers acquire their seeds. It is generally assumed that, in

developing countries, most farmers save their own seed on-farm, or swap grain for seed with seed dealers or grain elevators. Around 80 per cent of the seed requirements in developing countries is met in this way. Seed saving is important for farmers, because it can considerably reduce seed costs and it makes farmers less dependent on external suppliers. The grain/seed swaps, on the other hand, involve a credit system in kind. The farmer receives a bag of seed, in fact conditioned grain, from a dealer during planting time, and returns to the dealer a double or triple quantity of that grain during harvest time. This transaction has the advantage for the farmer of a lower seed price, and the avoidance of cash payment. Payment in kind makes farmers less vulnerable to inflation and lessens the pressure to market their produce. The benefit for the dealer is that he also can acquire three bags of grain for the price of one. Moreover, the swap is an unofficial transaction: payments of both royalty and tax can be avoided in this way.

Protection of PBRs does not seem to have direct negative effects on seed diffusion in the three Latin American countries which have had an operational PBR system for some time. In Argentina, where PBRs have reduced unauthorized seed trade in two important crops, seed dealers now have to pay royalties and taxes on the seed they used to swap for grain without authorization. So far the swap system has survived the PBR system, but as a legalized practice it is more expensive. These extra costs have not yet been passed on to farmers, but this may take place in the future.

PBR protection has not affected farmers who save their own seed from protected varieties. All five countries have included the *farmers' privilege* in their legislation, which means that farmers are allowed to save seed in order to resow their land. Exchanging saved seeds with other farmers is not allowed, but in practice unverifiable. Nevertheless, the introduction of PBRs causes a change of principle. When farmers start to use protected varieties, their natural right of seed saving becomes a legal right, or even less, a "privilege". Such a legal privilege is subject to political decision-making and prone to possible restrictions in the future.

A large group of farmers in the Latin American countries work with few resources and often under difficult ecological conditions. PBR protection does not seem to affect this group negatively because of the farmers' privilege, because they may use modern but public varieties, or because they use landraces which cannot meet the criteria for PBR

protection and are necessarily in the public domain. On the other hand, it is difficult to conceive how this group of farmers can benefit from the technological progress that PBR legislation aims to support. Many modern plant varieties are not appropriate for circumstances in which resource-poor farmers operate. The PBR system seems, therefore, predominantly to favour plant breeding directed at farmers who work under relatively prosperous conditions. Additional strategies are necessary to support breeding activities for resource-poor farmers. These strategies should aim at the sustainment of living conditions for the rural population, as well as the conservation of traditional plant varieties.

The period during which the PBR system has been enforced in the Latin American countries is too short to draw far-reaching conclusions about its impact in developing countries. There are enough indications, however, as to the direction in which the winners and losers of plant variety protection can be found.

The experience in Argentina, and to a lesser extent in Uruguay and Chile, indicates that PVP has supported the domestic plant-breeding industry. The main losers seem to be the seed dealers involved in unauthorized seed trade.

The effects of PVP may be different in countries where certification and variety registration schemes are not effective, where private plant breeding hardly exists, or where private plant breeders have less access to genetic resources. Nor can the perceived effects of the PBR system be generalized to other intellectual property systems, such as the patent system. Plant material which is protected under a utility patent cannot be used freely as a source of breeding by other breeders, while farmers are not allowed to save seed from patented plant varieties.

It seems to be worthwhile for all countries who consider the introduction of PBR protection to study the likely effects of this protection prior to the adoption of legislation. Early identification of potential winners and losers enables the design of PBRs or similar legislation that is consistent with national agricultural policies. Moreover, additional measures could be considered to mitigate or prevent some undesirable effects of PBR protection.

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Source: Walter and van Wijk (1995).

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