The Legal Protection of Software.

Implications for Latecomer Strategies in Newly Industrialising Countries (NICs) and Middle-income Countries (MICs)

Carlos Maria Correa

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3. Implications for Software Diffusion and Production in NICs and MICs.

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INTRODUCTION

This paper discusses, from an economic perspective, the main issues involved in the legal protection of computer programs, particularly as they concern Newly Industrialising and Middle-Income Countries (NICs and MICs).

Section 1 briefly analyses the characteristics of the world software market and production in order to set out the context in which the protection issue is dealt with. It holds that in this area there is a profound North-South technological and industrial asymmetry and that the prospects of developing countries to enter into this field are more limited than often claimed.

Section 2 presents the main legislative trends regarding software protection and the rationale underlying the prevailing copyright approach. It also examines the ambiguities and uncertainty created by the application of copyright law in this area, and the growing dissatisfaction with its coverage and effects.

The implications of software protection for the diffusion and local production of software are discussed in section 3. While the granting of some form of protection seems necessary for political or economic reasons, it is argued that its effects on the access to computer programs and on their development depend on the structure of the market and the country's relevant policies.

On the premise that no universally valid form of protection is sustainable, section 4 finally addresses some of the regulatory aspects that may influence the diffusion of productive software policies in NICs and MICs. It suggests that there is no general prescription on how to formulate an adequate legal strategy on the matter, and that the form and extent of software protection should take into account the economic and technological conditions as well as the objectives of the concerned countries.

The main conclusions of the study are presented in section 5.

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1. PRODUCTIVE AND TECHNOLOGICAL CAPABILITIES

1.1. World Market: Main Features

Software constitutes nowadays one of the most dynamic segments of the information technology market. The world software market accounted, in 1987, for an estimated US$ 48 billion; it grew at nearly 22% annually in the period 1984-87 [OECD, 1988, p. 21].

A significant part of the software market is dominated by hardware producers. As indicated in table 2, they accounted for half of the market in the United States. One hardware manufacturer (IBM) is the world’s major software producer, with sales over 5 billion annually in 1986. Those enterprises are rapidly developing software and strategic partnerships in order to strengthen their position as prime contractors and exploit emerging systems integration opportunities [Input, 1987, p. 2].

Software houses have captured a large part of the market (around 50% in United States) [see Table 1]. They have been particularly aggressive and successful in the market of programs for microcomputers and in application software. They also challenged hardware manufacturers positions in operating systems and software tools for big and medium-size equipment. Conversely, such manufacturers moved into the application and microcomputers field.

| Table 1 |

Software market by type of suppliers and products
(United States, 1983)

<table>
<thead>
<tr>
<th>Size of equipment</th>
<th>Systems software and utilities</th>
<th>Software tools</th>
<th>Application Software</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Suppliers</td>
<td>195</td>
<td>420</td>
<td>740</td>
<td>1,355</td>
</tr>
<tr>
<td>large</td>
<td>225</td>
<td>580</td>
<td>980</td>
<td>1,815</td>
</tr>
<tr>
<td>medium</td>
<td>115</td>
<td>295</td>
<td>330</td>
<td>740</td>
</tr>
<tr>
<td>small</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subtotal</td>
<td>535</td>
<td>1,295</td>
<td>2,050</td>
<td>3,910</td>
</tr>
<tr>
<td>Hardware Manufacturers</td>
<td>815</td>
<td>340</td>
<td>115</td>
<td>1,270</td>
</tr>
<tr>
<td>large</td>
<td>1,335</td>
<td>735</td>
<td>295</td>
<td>2,365</td>
</tr>
<tr>
<td>medium</td>
<td>230</td>
<td>235</td>
<td>105</td>
<td>570</td>
</tr>
<tr>
<td>small</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subtotal</td>
<td>2,380</td>
<td>1,310</td>
<td>515</td>
<td>4,205</td>
</tr>
<tr>
<td>Total</td>
<td>2,915</td>
<td>2,605</td>
<td>2,565</td>
<td>8,115</td>
</tr>
</tbody>
</table>


For Western Europe Input estimates that the market will grow between 1987 and 1992 at an average annual growth rate of 24% [Input, 1987, p. 4].

IBM, for instance, introduced 31 internally developed software packages for its PC in 1984, but with very modest results [Computer Systems News, 1985].
In spite of the existence of a great number of firms, the software market is highly concentrated. In the United States, for instance, fifteen out of more than one thousand firms concentrated 74% of retailer sales in 1985; in software for microcomputers only three enterprises controlled 35% of total sales [Katz, 1987, p. 22].

Table 2
Major Software markets
(current million US$ of 1984)

<table>
<thead>
<tr>
<th>Country</th>
<th>1984</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>14,300</td>
<td>23,301</td>
</tr>
<tr>
<td>Japan</td>
<td>2,368</td>
<td>4,522</td>
</tr>
<tr>
<td>France</td>
<td>1,776</td>
<td>3,246</td>
</tr>
<tr>
<td>Germany</td>
<td>1,487</td>
<td>2,824</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1,469</td>
<td>2,856</td>
</tr>
<tr>
<td>Italy</td>
<td>890.1</td>
<td>1,822</td>
</tr>
<tr>
<td>Canada</td>
<td>487.6</td>
<td>824.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>461.7</td>
<td>861.9</td>
</tr>
<tr>
<td>Australia</td>
<td>452.1</td>
<td>925.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>363.5</td>
<td>2,186</td>
</tr>
<tr>
<td>Sweden</td>
<td>286.8</td>
<td>555.5</td>
</tr>
<tr>
<td>Switzerland</td>
<td>276.0</td>
<td>523.5</td>
</tr>
<tr>
<td>Spain</td>
<td>242.3</td>
<td>548.0</td>
</tr>
<tr>
<td>Belgium</td>
<td>241.7</td>
<td>452.2</td>
</tr>
<tr>
<td>South Africa</td>
<td>208.0</td>
<td>364.0</td>
</tr>
<tr>
<td>P. R. of China</td>
<td>175.0</td>
<td>968.0</td>
</tr>
<tr>
<td>Denmark</td>
<td>166.8</td>
<td>323.2</td>
</tr>
<tr>
<td>Israel</td>
<td>166.0</td>
<td>249.0</td>
</tr>
<tr>
<td>Norway</td>
<td>155.8</td>
<td>315.8</td>
</tr>
<tr>
<td>Austria</td>
<td>152.0</td>
<td>284.1</td>
</tr>
<tr>
<td>Finland</td>
<td>150.5</td>
<td>290.9</td>
</tr>
<tr>
<td>Mexico</td>
<td>50.0</td>
<td>117.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>54.3</td>
<td>n.a.</td>
</tr>
<tr>
<td>Korea</td>
<td>40.0</td>
<td>107.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>27.0</td>
<td>71.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>26.0</td>
<td>57.0</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>25.0</td>
<td>61.0</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>25.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Portugal</td>
<td>22.0</td>
<td>n.a.</td>
</tr>
<tr>
<td>Malaysia</td>
<td>20.0</td>
<td>67.0</td>
</tr>
<tr>
<td>India</td>
<td>18.3</td>
<td>37.7</td>
</tr>
<tr>
<td>Turkey</td>
<td>6.9</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Source: OECD (1988), Table 2.

The software market is not homogeneous. Hence, the capabilities and resources needed to participate in it differ considerably, depending on the type of the products and the size of the equipment with which they operate. In Western Europe for instance, custom and packaged software accounted, in 1985, for about half of the market each, while in the United States the latter already accounted for 70% or more of the total market (OECD, 1988, p. 32-33). In broad terms, moreover, within the segment of packages, the market in roughly divided (for Western Europe) in three parts: systems and utilities, application tools and application solutions – which represented about one third of the market each [Financial Times, 1986].
Finally, the software market is highly concentrated in OECD countries, which accounted for nearly 97% of the world market in 1984. The United States domestic market represented 54% thereof. Only a few developing countries rank, as indicated in table 2, among the major software markets in the world. Brazil would be the single one among the first ten, quite far from Mexico and South Korea.

It is extremely difficult, with the available data, to determine the size, structure and worldwide distribution of software industry. The detailed work undertaken by OECD [«OECD»], 1985 and 1988] and other studies permit to obtain, however, a general picture.

The United States concentrates a major part (around 70%) of world software production, followed by France and Japan [U.S. Department of Commerce, 1984]. Analyses at country level indicate for most countries, including developed ones, that a significant part of the market consists of imported software distributed by local dealers or by subsidiaries of foreign enterprises. This applies particularly to basic software and various software application tools. Application solutions, instead, are more dependent on local conditions and, therefore, are de facto reserved to a great extent of local firms.

The production of software – and particularly the related R&D activities – is highly concentrated in producers’ centers located in home countries [«UNCTC», 1984, p. 33]. Internationalisation takes place mainly through the commercialisation of products and the local support given by subsidiaries or distributors.

American software industry is the most internationalised one among those of OECD countries. A significant part of its worldwide revenues have a foreign origin. France ranks second according to the level of internationalisation of its industry (mainly based on the provision of custom software); United Kingdom, Canada and New Zealand follow. Japan presents one of the lowest levels of internationalisation within OECD [«OECD», 1988, table 24].

Although no specific information is available, it is completely safe to affirm that the world market share of developing countries is in a 3%-5% range and that it almost entirely corresponds to application software for domestic markets. Some NICs have initiated attempts to develop an export-oriented software industry. However, their results are still marginal in global terms. The more relevant experiences are referred to in the following point.

1.2. Software in Developing Countries

Studies on the size and structure of software markets in developing countries are scarce. In overall terms, developing countries are largely dependent

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3. The figures for Brazilian software market contained in the OECD study, however, should be cautiously considered. Other sources estimate a considerable lower market size (see point b) below) [cf. Table 3].

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on hardware and software imports. The latter mainly include basic software, application tools and other types of packaged software. Some countries also import custom software, particularly for public administration projects. However, applications such as for administrative and accountancy tasks, are generally developed by local firms. In a few cases (e.g. Brazil, India) the development of basic software, including operating systems, has been envisaged by public and private enterprises 4.

Locally developed software accounts for a minor part of the market in Latin America. In Argentina, a survey established that only 30% of the market (in value) was covered by local production [Subsecretaria de Informatica y Desarrollo, 1987, p. 9]. A similar proportion has been found in Mexico [«ANIPCO», 1987, p. 9]. For Brazil, a recent estimate indicates that only US$ 200 million out of a total market of US$ 700 million is provided by local software producers (in-house development excluded [Pereira Lucena, 1987, p. 19]. In the Andean Group countries, finally, local software industry is also incipient and basically limited to the supply of application solution programs [Foerero, 1987; for Venezuela, see Martinez, 1988].

The situation in Asia, even in those developing countries which have created important capabilities in hardware manufacture, does not substantially differ from the one depicted for Latin America. Some Asian NICs have made, nevertheless, significant efforts to increase domestic software production and, particularly, to develop export opportunities. The best known example is India. As early as in 1970, Indian government devised policy measures in order to expand software exports, on the basis of perceived comparative advantages in terms of personnel costs and qualifications and the use of English language. The very ambitious objectives set forth, however, were not achieved after fifteen years of application of those measures [Correa, 1987, p. 23]. In 1986 the policy was changed – and liberalised – while some arrangements with transnational corporations (Burroughs, Texas Instruments) started to produce some results. In the fiscal year 1987-88 exports for RS. 80 crore were made. «But of course», pointed out the Secretary of the Department of Electronics, «a significant part of it is in people (manpower) exports or body shopping or whatever». The establishment of «software technology parks» in India, with direct satellite links with companies in United States is currently being promoted [«Computers Today», 1988, p. 11].

Singapore put into practice in 1982 a policy that included the granting of subsidies and the establishment, together with transnational corporations (IBM, ICL, NEC), of training centers and research projects, in order to become a software exporter by 1990. The development of software enginee-
ring tools (CASE) by a Singapore firm (which opened a subsidiary in the United States) has been reported [American Programmer, 1988, p. 1].

Isolated cases of software exports have been identified in various Latin American countries (Argentina, Brazil, Chile, Colombia, Venezuela, Mexico, Costa Rica, etc.) [Informática e Integración en América Latina y el Caribe, 1988]. But neither the number of cases identified and the nature of the products involved nor the economic dimension of the operations made, justify the often exaggerated optimism that prevails in Latin America concerning the opportunities offered by the software industry. In fact, as indicated in the following point, the simplistic belief according to which it would be easy for those countries to become important software producers and exporters – is contradicted by present realities.

1.3. Comparative Advantages

The determinants of competitiveness in software markets have not been thoroughly studied yet. The dimension of the domestic market and the size and marketing capabilities of the United States firms may explain their success at the national and international level [«OECD», 1988, p. 51]. In most other countries, including France, the limited size of the market seems to be a significant restriction on the growth of the software industry, particularly on expanding towards standard software [Correa, 1987]. In the case of Japan (the second largest country by the number of computers installed), the emphasis traditionally put on custom software and the barriers imposed by language may be some of the factors that explain a very low degree of participation in the international market, notwithstanding the size of the domestic market and the fact that Japanese programmers are reported to be many times more productive than their American colleagues [U.S. Department of Commerce, 1984, p. 11].

In many developing countries software production has been identified as a promising field of action. Although, it is argued, newcomers face high barriers for joining the production of hardware, with low capital investment and the mobilisation of local qualified personnel, it is relatively easy to exploit the growth potential of the software sector. Paradoxically, a few NICs have evidenced an ability to successfully break into some segments of hardware production (e.g. microcomputers and peripherals), while the efforts made to establish software capabilities have not had, at least up to now, significant results.

A number of factors may favour the development of software in developing countries. Among them, low wages scales for computer professionals seems the most clear cut advantage. In countries such as India, Brazil and Argentina, local salaries may be many times lower than those prevailing in OECD countries [Katz, 1986; Takahashi and Pereira Lucena, 1988; Subsecretaría de Informática y Desarrollo, 1987]. There may also be advantages stemming
from external circumstances, such as growing software backlogs and scarcity of personnel in developed countries, the proliferation of international subcontracting, etc. [see Table 3].

**Table 3**

**Factors in the Development of Software by Developing Nations**

<table>
<thead>
<tr>
<th>Factors favoring the development of software</th>
<th>Factors retarding the development of software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low wage scales</td>
<td>Small domestic markets</td>
</tr>
<tr>
<td>Growing software backlogs</td>
<td>Low capital availability</td>
</tr>
<tr>
<td>Increasing development, operating and</td>
<td>Lack of marketing expertise</td>
</tr>
<tr>
<td>maintenance costs</td>
<td></td>
</tr>
<tr>
<td>Lack of specialized software for local</td>
<td>Absence of an informatics or computer</td>
</tr>
<tr>
<td>conditions</td>
<td>industry policy</td>
</tr>
<tr>
<td>Proliferation of international subcontracting for software development; joint training centers</td>
<td>Absence of taxation/fiscal and R&amp;D incentives for software producers; regulatory restrictions on importation of technology and software</td>
</tr>
<tr>
<td>Local support services requirements</td>
<td>Shortage of labor with required skills; re-tention of highly skilled labor necessary</td>
</tr>
<tr>
<td>Modification requested by users</td>
<td>Shift toward semi-automated programming</td>
</tr>
<tr>
<td>New communication technology</td>
<td>Language barriers</td>
</tr>
<tr>
<td></td>
<td>Severe competition from large companies in R&amp;D and marketing</td>
</tr>
<tr>
<td></td>
<td>Difficulties in providing adequate mainte-nance and support</td>
</tr>
</tbody>
</table>

*Source: Schware, 1987, p. 1256*

At the same time, however, there are a number of facts that considerably dilute the real possibilities for developing countries to break into the software field.

In addition to the smallness of domestic markets (an aspect which plays a part even with countries like Brazil), there is generally a shortage of professionals actually qualified to develop software in accordance with international standards, as well as for the management of software development projects of a certain complexity. Moreover, even if those skills are available, the marketing of software, and particularly the access to extremely competitive markets such as the American one, poses extremely difficult problems [Katz, 1987]. It is not enough to develop a good software; it is necessary to know how to sell it.

A survey made in Argentina with major local software producers revealed that most firms considered that their comparative advantages (availability of

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5. In Brazil, it has been noted, for instance, that through there are capabilities to develop an ADA-like compiler, skills for managing a project for the development of an environment in that language which would involve a million and a half lines of code do not exist [Pereira de Luce-na, 1988, p. 17].
qualified personnel, low salaries) were not sufficient to compensate the obstacles for software development and commercialization. The obstacles more often cited included the small size of the market, the lack of resources and capabilities in R&D and in marketing, and limitations as to capital investments. In connection with the export of software, the difficulties concerning marketing and distribution and the post-sale client's support were particularly mentioned [SPCALAI, 1988].

In fact, the problems related to commercialization, particularly in foreign markets, are crucial in any attempt to develop export opportunities. Moreover, the mere identification of a concrete potential demand is problematic, when there is no proximity with the potential user. For this reason, the establishment of subsidiaries or joint ventures may be an essential instrument to enter foreign markets in this field [Correa, 1987, p. 8].

Some NICs have implemented in recent years policies aimed at fostering software development for domestic and for export markets. In Brazil, software policies are centered, like hardware policies, on the domestic market. The Brazilian «Software law» includes a sophisticated régime for the commercialisation of local and imported software in the domestic market. It provides – the same as for hardware – a «market reservation» in favour of locally developed programs which are «functionally equivalent» to those whose importation is sought. The registration of imported programs is compulsory, and they have to be distributed by national companies (except for programs applicable for equipment commercialised by foreign companies).

According to Brazilian regulation, there are three categories of computer programs for registration purposes: A) software developed in Brazil by a national company using its own technology; B) software of foreign origin, the technology and commercialization rights of which have been transferred to a national firm, under a contract approved by the National Institute of Industrial Property (INPI), and C) software developed abroad by a foreign company and marketed by a subsidiary or foreign controlled company established in Brazil.

National registered software increased more than 30% annually between 1984 and 1986, and foreign software 5%. In 1986, the participation of national software reached 33,5%. Though there is a number of nationally developed computer programs (category A) similar to those of foreign origin (category C), the latter clearly prevails in «basic» and «support» software [see Table 4].

Indian policies on software aim simultaneously to develop applications for the domestic market and to promote exports. In 1986 the Software Deve-

6. Software engineering tools are very rarely used in Argentina [SPCALAI, 1988]. Such tools may erode in the long term eventual competitive advantages based on the availability of low cost - qualified personnel.
TABLE 4
Brazil: Registered Software by Origin and Types *
(Number of registered programs)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Nationally developed</td>
<td>441</td>
<td>11,2</td>
<td>1627</td>
<td>23,7</td>
</tr>
<tr>
<td>(B) Developed abroad, commercialized by Brazilian firms</td>
<td>56</td>
<td>1,4</td>
<td>60</td>
<td>0,9</td>
</tr>
<tr>
<td>(C) Developed abroad, commercialized by branch or subsidiary</td>
<td>3949</td>
<td>100,0</td>
<td>6874</td>
<td>100,0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b) Types (1986)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category *</td>
</tr>
<tr>
<td>Basic</td>
</tr>
<tr>
<td>Utilities</td>
</tr>
<tr>
<td>Applications</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>%</td>
</tr>
</tbody>
</table>

* Registration is made before the Secretaría Especial de Informática (SEI).


The development Agency (SDA) was set up and the imports of software were substantially liberalised. The Stateowned Computer Maintenance Corporation (CMC) and the National Informatics Center (NIC) are involved in the development of applications, including – in the case of NIC – the establishment of an informatics network (NICnet). The National Centre for Software Technology (NCST) and the Centre for Development of Advanced Computing Technology (created in 1987) are some of the institutions responsible for technological development in the field.

A Software Promotion Law came into effect on July 1988 in South Korea. It established a Council of Software Industry Promotion, composed of government officials, scientists, and industrial experts for software development and productivity improvement, manpower development, and building up software development environment.

A functionally specialized software complex as an industrial base for software is going to be established in the Seoul area. In the complex, the software companies are able to specialize in one area and thus raise productivity, as
more software and software-related companies are placed in the limited area. The complex will eventually be a platform for expansion to the international market. In addition, the Government is considering the guarantee of loans from domestic commercial banks to software companies without any collateral (Article 10), and the building of a system for implementation of software quality assurance (Article 7). Furthermore, a guideline for estimating the software development costs is prepared so that software is valued adequately (Article 8). In order to utilize efficiently the scarce local software development resources, and also to assist marketing local software products both domestically and abroad, a software information center is going to be established for effective software information exchange.

South Korea has also included the development of software as a part of the National R&D Program since 1982. It also launched a large software development project. The SUPER (Software Usability and Productivity Enhancement Research) project is a R&D program for enhancing the software usability and productivity, driven by the Government with wide participation of private companies, university research centers and government research organizations. Major research areas of the Project include software engineering technology, systems software, artificial intelligence and high-level applications software technology – including CAD/CAM, among others. The planned expenditure for the Project is 900 billion Won until 2001. In 1988, the first year of the project, the Government invested 3 billion Won [«UNIDO», 1988, p. 61].

1.4. Foreign Direct Investments

The propensity of software producers (including hardware manufacturers) to make direct foreign investments in developing countries for the production of software is considerably low. In accordance with an OECD survey, the delocalisation of some software development and programming activities in developing countries has not been deemed «useful» by the majority of respondents. Only 40% thereof thought that it may be convenient to be close to end-users, while 34% considered delocalisation for cost and quality performance [«OECD», 1988, p. 57].

A number of cases of foreign direct investment for software production in NICs and MICs can, certainly, be identified. As mentioned before, some transnational corporations have invested in India. Texas Instruments and Citicorp have set up whollyowned subsidiaries which undertake the development of software for integrated circuits design and of application programs for the banking sector, respectively. The Tata Unisys joint-venture is one of the major software producer firms in India. Other joint-ventures have been established between Patni and Data General and between Hinditron and Digital Equipment 8. Foreign firms have localised software development

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8. The Indian government expects about twenty companies to set up development facilities at the Pune export-oriented software technology park [«Computers Today», 1988, p. 11].
centers in Singapore, having in view exports to the ASEAN region and to OECD countries. Joint-ventures between Japanese firms and firms from South Korea, China and Taiwan have also been established; Epson and Apple made arrangements in Venezuela [Martínez, 1988].

In general terms, however, the cases mentioned before do not constitute a significant trend; foreign investment in the software area in developing countries is the exception rather than the rule. A similar situation can be identified in connection with the transfer of technology for software production towards developing countries. [«UNCTC», 1984, p. 140; «UNIDO», 1984, p. 39].

2. Legal protection

2.1. Main Legislative Trends


The determination of the appropriate legal framework for the protection of software gave rise to considerable debate in both developed and developing countries. In some of them, attempts were made to devise special rules for software protection, in order to take into account its functional character and the peculiarities of its commercialisation and use. In Japan, MITI proposed a special régime in 1983, in order to exclude moral rights, limit protection to 15 years and regulate the use of software on terms balancing the private and public interest. In France, the National Institute of Industrial Property also proposed a sui generis optional protection (1984). In Brazil and Argentina some draft laws proposed also special rules (though, in the latter country, having copyright as the general framework). Most of these proposals have been abandoned by now (see also point b) below).

The protection of software under copyright laws is the predominant trend worldwide. Besides the cases where specific amendments were introduced to such laws, in a number of other countries judicial or administrative decisions also followed that direction (Switzerland, Belgium, Italy, Mexico, Chile, etc.).

In most cases, the adoption of the copyright approach has been instrumen-
ted by amendments to copyright laws which specify that software is a copy-
rightable work and the rights relating to copies and adaptations. In a few
countries the reforms have been deeper, such as Japan and France [Correa et
al., 1987, p. 116] as well as in South Korea, Brazil and Indonesia.

All developing countries that have already adopted legislation in order to le-
gally cover computer programs have admitted the copyright principles. The
threat of the application of section 301 of the 1984 US Trade Act, has
prompted some countries to deal with the issue in accordance with that ap-
proach 9. In Brazil, the «Software law» of 1987 regulated the application of
copyright to computer programs, but also created a detailed régime for the
commercialization of such programs in the country.

2.2. Rationale for Copyright Protection

Abundant literature has analysed the different legal institutes under which
software may be protected, namely copyright, trade secrets, contractual law,
patents and a special régime. The application of utility models has also been
proposed [Higashima, 1986, p. 12]. As mentioned before, the prevailing
trend, after some unsuccessful attempts to establish special régime, is soft-
ware protection under copyright 10.

The referred trend has been strongly influenced by the American position
on the subject, particularly after the amendment, in 1980, of the United
States copyright law. In turn, the option for this form of protection has
been determined to a great extent by the domestic and international inter-
ests of large software producers. The main advantages for them in relying on
copyright derive from:

— the possibility to apply well-known and generally respected principles
   and rules.;
— the assimilation of software producers’ rights to those of literary, artistic
   or scientific authors, in spite of the functional character of programs;
— the access to established legal remedies against unauthorized reproduc-
   tion;
— the long term of protection conferred;
— the commencement of protection since the date of the creation of a pro-
   gram;
— the lack of registration requirements to obtain protection;
— the existence of international conventions where protection is obtainable
   on a universal basis.

The last point mentioned is crucial for the international operation of the in-
dustry. To the extend that the copyright approach is admitted, under the

9. Pressures have been exercised on several Asian and Latin American countries (particularly
Brazil). Thailand is still in conflict with the United States on this matter [Krim, 1989].
10. After hesitation, also the Soviet Union is likely to soon join those countries who support
the copyright approach.
Universal or the Berne conventions, a computer program created in one country automatically receives protection in almost any country in the world. The monopoly rights granted facilitate to commercially exploit such programs on a worldwide basis. The stronger the protection, the lower is the need to be present (through a subsidiary or license) in a particular market. The world market can thus be supplied under the highly centralised productive scheme that prevails in the software industry, at least wherever standard products can meet the users' demands and there are no other factors compelling for some form of permanent establishment.

Conversely, copyright offers some disadvantages from the producers' standpoint. The main one is that it is conceived to prevent copying and not the use of a protected work. Henceforth, the legal power to prevent unauthorized use (including private use) is limited. Another problem may arise in connection with the originality requirement. In some countries where high standards are applied, many computer programs may not qualify for protection. In fact, in many cases a piece of software is determined by functional specifications in such a way that the scope for originality is very restricted or unexistent. In addition, copyright only protects the expression of a work, but not the underlying idea. It therefore allows third parties to base any new development on an existent idea, even if the latter's expression is protected.

On the other side, the impact that the introduction of protection may have in fostering a domestic industry is quite uncertain. Protection is particularly important for standard software, and especially for packages that run on microcomputers. Unauthorized copying of bigger systems is more difficult given the suppliers' proximity (through maintenance and other services) with equipment installations. For custom software - which is precisely the area in which domestic firms mostly work in NICs and MICs - contractual provisions may be far more important for protection than any general legal regime.

From the point of view of the user, copyright exhibits many disadvantages which come from of the original conception of that legal system. Designed to protect intellectual works as an emanation of human creativity, it is strongly biased in favour of the author's rights. While many faculties accrue to him, obligations are minimal. Unlike patents, for instance, no working obligation is generally established. At the same time, protection may be obtained even without disclosure of the work. The long terms of protection (generally fifty years post mortem auctoris) do not allow the society to benefit from the free use of the work (in this case a technical functional work) wi-

11. Countries such as South Korea, which had not adhered to such conventions, have recently revised their position thereon, in part as a result of American direct pressures.
12. In France and United States, on the contrary, a low originality requirement is applied.
13. See, however, the implications of the Whelan case below in this section (point e).
14. This fact explains that national producers concentrated on custom development, did not discover the issue of software protection until pressures of package distributors emerged.
thin a reasonable period after its development. Furthermore, as stressed by the MITI's proposal of a special régime, that system does not contain provisions to guarantee the user against defects or lack of support for the use of the programs «MITI», 1983. Finally, the granting of «moral rights» contradict the nature of software as a living entity, which is constantly adapted and improved.

2.3. Copyright questioned

In the light of the difficulties to treat software as a copyrightable work and of the shortcomings referred to, it is not surprising to find criticism and several reservations on the copyright approach, even in developed countries where it has been formally adopted.

Disatisfaction comes from many sides. Producers are unhappy with the limited effect of copyright on actual copying. Producers' associations claim continuous losses due to piracy in United States and other countries. Surveys made in United Kingdom and Holland, for instance, indicated a general lack of confidence in the protection provided for computer programs by copyright law. Only 15% of the respondents (in the case of Holland) stated that they were prepared to enforce their legal rights in civil courts in case they were confronted with software piracy. This attitude results from the lack of a clear, unambiguous legislation [Borking, 1987]. On their side, users are often confronted with too restrictive clauses, for example, in connection with archival back-up copies [Meisner, 1988, p. 397] and educational purposes «OTA», 1986, p. 8]. For instance, a highly controversial draft bill was introduced in April 1988 in France in order to allow universities and graduate schools «to reproduce the software they have acquired for their educational activities, provided that these copies are not used outside of those universities and schools» [Bertrand and Cousté, 1988].

In United States, the policy on software protection, states a study of the Office of Technology Assessment, «is being made in the courts, virtually on a case-by-case basis, and the resulting ambiguities satisfy no one» [OTA, 1985, p. 34].

Case law has, in effect, a decisive role in shaping the scope of protection afforded in that country. One major development has led to a re-interpretation of the principle that confines copyright protection to the program's expression. In Whelan Associates vs. Jaslow Dental Laboratory, while recognizing that copyright protection does not extend to the «idea» or function of the program, the court held that it covers the sequence, organization and structure of the code-program 15. Furthermore, in Broderbund Software vs. Unison World it was decided that the protection of the underlying program

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15. A similar decision was taken in the Gem Scan case in Canada [MANN, 1987].
extends to all elements of its audiovisual display. Courts also face the need to decide on the imprecise frontiers of copyright protection in specific cases. After an intense debate they decided to support the copyrightability of «microcode» – which controls the sequence of operations carried out within the computer in response to a particular instruction received – in NEC Corp. v. Intel Corp. [Sandison, H. 1987] despite its clear mechanical and utilitarian nature.

In Alloy v. Ultratek, moreover, the copyrightability of hardware itself in the form of Programmable Array Logic chips (PAL's) is at stake. If the decision is affirmative, «then hardware – at least its low-level, step-by-step functionality – would qualify as a «work of authorship», placing virtually all unpatented logic devices (generally presumed to lie in the public domain) under the protection of copyright law» [Siegel R. and Laurie R., 1989].

In other pending cases (based on suits by Lotus, Development Corp., Ashton Tate Inc. and Apple Computer Inc.) judges are bound to decide whether a software company can legally protect a program's appearance, design and function – its «look and feel». If granted, such a protection, would include visual program features as pull-down menus, graphic symbols and even certain keystroke sequences. This eventual further extension of copyright has already brought up considerable criticism, and raised questions on the capabilities of American software firms to compete on the basis of innovative ideas rather than on the basis of legal instruments [Burgess, J. 1989; «Business Week», Editorial, 1989, p. 22].

The confusion on the means to ensure the legal protection of software has increased recently in the United States, due to the so far successful attempts to ensure patent protection for computer programs. Recent evidence indicates «that all software claims are eligible for patent protection unless they simply involve the use of a mathematical formula to calculate and display a number. Software patentability is a de facto reality today, as the Patent and Trademark Office (PTO) now commonly issues patents for software inventions» [Maier, 1987, p. 157].

16. This interpretation has also been embraced by the U.S. Copyright Office, though other decisions have ruled that a separate protection for such displays should be sought for [Russo, Hale, 1988, p. 9].
17. In accordance with one opinion, the protection of microcode by copyright could result in an extension of the monopoly of the copyright owner beyond the termination of any patents governing the computer systems. «The lengthy copyright monopoly with its presumption of validity would be a frightening weapon having significant in terrorem effect against any competitor developing a computer with an instruction set compatible with a previously developed computer or microprocessor, whether copied or not» [Mc Pherson et al., 1986, p. 4].
18. Examples of patented software inventions include a process for a management control system for multiprogrammed data processing, a method of constructing a task program for operating a word processing system, a program that checks for spelling errors, and a program that converts one programming language into another (an RPG to COBOL compiler). Perhaps the best known software patent was issued to Merrill Lynch for a Securities Brokerage and Cash Management System. Protection is conferred by the PTO without requiring the submission of full source-program, i.e., only partial disclosure is being accepted at the administrative level.
The inadequacy of copyright protection should, in view of the United States Congress Office of Technology Assessment (OTA), lead to the development of a new legal framework:

The distinction between writings and inventions is indeed breaking down with respect to functional works such as computer software and semiconductor chip masks. Because there are many works of this type, they may require their own framework for protection. If it were based on the distinctive characteristics of these works, the law might be more accurately targeted to achieve specific policy outcomes, thus serving as a more robust policy tool. With a new category of law, both producers and users would face less uncertainty each time a new type of work were introduced. OTA’s analysis suggests, too, that a fruitful basis for a revision along these lines might be found in the distinctions between works of art, works of fact, and works of function «OTA», 1986, p. 14].

Paradoxically, OTA recommends an approach that, as indicated before, the United States government has strongly opposed, particularly in Japan. The need to look for a special form of protection was also stressed in other countries when amendments to their respective copyright laws were proposed or approved. In France, the Rapporteur Senator Jolibois qualified software as being of «industrial character». Moreover, it was stated that the law was «approved as a temporary measure, still remaining as an ultimate objective the search for a specific form of protection which will surely require some years to be found» [Journal Officiel, 1985]. In Australia, the Minister of Justice referred to the 1984 amendment in his country’s legislation as «a solution for the short term», which should allow to completely revise the policy adopted for the long term. In Canada the study «From Gutenberg to Teldon» understood – like some judicial decisions in several countries – that the object program was not protectable under copyright law. A special title for ten years was proposed.

It should also be recalled that the specialized UN organization on intellectual property, the World Intellectual Property Organization (WIPO), proposed in 1978 a set of model specific rules on software, later on abandoned as the copyright approach became prevalent. The WIPO’s recommendations have been the basis, however, of many initiatives such as the comprehensive computer draft law recently distributed by the Ministry of Justice of Israel [Levenfeld, 1988, p. 5].

Many authorities have objected to or made reservations on the application of copyright to software: Tolle (Switzerland) advocates that software is an intellectual method, not a creation. It would lack esthetic character [Ulmer and Kolle, 1983]. Desjeux (France) stresses that intellectual property is a «hommage» of society to «creators» (moral rights, long term of protection, etc.). The inventor receives more limited rights, like the software producers

19. In IBM Corp. v. Ordinateurs Spirale a Canadian court, however, accepted copyright for an object program. In 1988 the copyright law was amended in order to fully incorporate software as a copyrightable work.
should, since the latter make an "intellectual contribution" but do not «create» [Desjeux, 1986]. Vanderberghe (Belgium) argues that the lack of human communication in software conspires against the fundamentals of intellectual property [Flamèe, 1985]. G. Shipley (United Kingdom) affirms that software is different from protectable works both for its origin and use [Shipley, 1985]. Jean Jonquères, Presiding Judge of the Supreme Court, in Paris, after analysing the disappointment with software protection through copyright, concludes that the protection by a patent is likely to be even more disappointing in view of the traditional strictness in applying the criteria of patentability and the interpretation of the claims. In the absence of any general text governing the protection of intellectual property, would it not be better to move towards a protection sui generis? This, with the protection provided by legal proceedings for unfair competition, is the only satisfactory protection for intellectual creations [Jonquères, 1987, p. 620].

Briefly, copyright has not succeeded yet to become an uncontested and satisfactory framework for software protection. It is likely, in fact, that even if it is admitted that software deserves legal protection, the debate over the form that it should assume will continue in the future. A crucial point is how a proper balance among the different interests at stake can be reached. Of course, such a debate is of utmost relevance for developing countries, particularly for those which intend to formulate active policies with regard to the diffusion or local production of software.

3. IMPLICATIONS FOR SOFTWARE DIFFUSION AND PRODUCTION IN NICs AND MICs

The analysis made in the precedent sections indicates, first, the existence of a profound North-South asymmetry in technological and productive capabilities for software development; second, that notwithstanding some efforts, the NICs and MICs have not been able to achieve significant positions in the software field; third, that the existence of given comparative advantages for software development in those countries is questionable.

On the other side, section 2 has showed that considerable uncertainty and ambiguity prevails in connection with the extent of protection conferred by copyright.

What implications may the prevailing software protection patterns have on NICs and MICs in this context? This question should be dealt with in relation to two aspects: the diffusion and the local production of software.

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21. In its proposal on intellectual property in GATT, the EEC has held, for instance, that software protection should take account of the legitimate interests of users, the promotion of international standardization, the development of compatible and inter-working systems and maintaining the conditions of competition (July, 1988).
From the point of view of diffusion, liberal copying would arguably reduce the cost of access to software. In the last analysis, suggests Prof. Wells, for a country which is not an innovator in the field it may be convenient, from an economic perspective, to facilitate the obtention of copies at low costs to stimulate a rapid software diffusion and save foreign currency [Wells, 1987]. High software prices may make it difficult for domestic firms to compete internationally. Important trade-offs may exist, however, whether protection is granted or not. The lack of appropriate maintenance and after-sales support, and the consequences thereof for an efficient application of computer programs, may limit the advantages of non-protection. On the other side, while licensing under copyright may slow the diffusion of certain types of software, it may at the same time support the introduction into the economy of high-quality types of software. From an international point of view, moreover, a free-copying approach would be extremely conflictive. It does not seem feasible nowadays for a country to complete by departure from generally accepted rules when it comes to the value involved in intellectual work protection.

The initiatives for strengthening and internationally expanding the legal protection of software, have almost completely disregarded the problems that it poses for developing countries. The establishment of some form of protection will, in the first place, work in favour of those enterprises already operating in the market. It will eventually reduce piracy and increase the income obtained through the distribution of a larger number of copies, at a higher price. Firms exporting software to the protected market would be among the main beneficiaries of the legal change. It is noticeable, however, that according to an OECD survey, the lack of protection by national law is not deemed by exporting, firms to be a «high» obstacle for international operations, but just one of «medium» importance «OECD», 1988, p. 65].

As mentioned before, the impact of protection considerably differs according to the type of software developed. It may eventually have a significant impact if national firms envisage to compete in the area of packages; this is, however, a considerably limited possibility due to the size of local markets, the investments needed and the difficulties to specify on the basis of a general potential demand. If software development basically means production of custom programs, legal protection will not add very much to the existing situation.

The surveys made in some countries illustrate the software supplier’s point of view on the issue. The information collected in Argentina and South Korea revealed a general attitude in favour of legal protection 5. In both cases,

22. In Thailand, for instance, Lotus 1-2-3 could cost USS 715, more than twice as many bahts earned in a month [Kim, 1989].
23. The Argentine survey was responded by 156 firms producing, importing or distributing software [Subsecretaria de Informatica y Desarrollo, 1987, p. 72]; in South Korea, 384 replies were obtained on the basis of a questionnaire sent to 2780 persons including businessmen, academics, researchers and public officials with ties to or interest in the computer software field [Song, 1987].
however, an important proportion of respondents indicated their preference for a special régime rather than for copyright (90% in Argentina; 42% in South Korea). Moreover, in the case of South Korea, the majority (96%) «feared that the implementation of such protection at too early a date would hamper the growth of the domestic information industry» [Song, 1987, p. 5].

In sum, to the extent that a local industry is confined to or concentrates itself on custom programs, the effects of legal protection will mainly reflect on imported software. Even in the case where packages are also produced, it can not be assumed – obviously – that the introduction of protection or of a strengthened régime will lead automatically to more and better local production. The legal framework will be one factor that may influence the software development, but in no way it may be deemed to be the most important or even a significant promotional element. The protection conferred may eliminate the unfair competition of pirated programs sold for a few dollars. This positive effect may be counterbalanced, however, by a stronger competitive position ensured to importing firms and, eventually, by a larger presence of foreign companies in the local market.

Another aspect to be considered is the situation of a country that does not confer protection and is willing to export software to third countries. Under present international conventions (Berne and Universal) the member countries are only bound to grant foreigners «national treatment». This rule would not be violated if neither foreigners nor nationals were granted protection. It is doubtful whether it can be interpreted that those conventions cover computer software within their widely defined scope. However, present initiatives of the United States at GATT precisely aim, among other things, to establish software protection under copyright as a universal standard. Japan and the EEC also share this proposal, notwithstanding some differences as to the content of the standards and norms to be developed [Correa, 1988b].

In any case, it seems clear that the development of a local software industry will not be necessarily benefitted – it may also be jeopardised – by the establishment or strengthening of a legal system of protection. The promotion of a software industry will require more complex and specific instruments than simple protection. The experience of many countries – Brazil, India, South Korea – indicates that special policies had to be implemented with that aim (see point 1.3 above).

4. OPTIONS FOR NICs AND MICs

The newness and complexity of the protection issue, and the confusion existing in developed countries, makes it extremely difficult for a developing country to adopt decisions on the matter. As mentioned before, disatisfac-
tion with the copyright approach is important and growing. The patent system does not seem to offer a better solution. It makes protection stronger since even independent developments on the basis of the underlying ideas of a program would be excluded. The setting up of a special régime, finally, faces the difficulties inherent to the creation of a completely new legal framework, particularly vis-à-vis its recognition in other countries.

Independently of the approach followed, a number of key issues need to be considered if certain industrial or diffusion objectives are sought for.

4.1. Subject Matter and Scope of Protection

While recognising that protection extends to computer programs in its source or code form, or even embedded in a Read Only Memory (ROM), the development of the industry requires that the ideas themselves do not become directly or indirectly the property of the program title holder. In this sense, the Japanese law explicitly excludes from protection the algorithms and rules employed in the development of a program. Likewise, languages should not be considered copyrightable. Only the expression of a program is to be deemed protectable, if some room for alternative creation of software is to be retained.

4.2. Duration

The typical duration for copyrights, as mentioned before, generally extends beyond the author's death. In case of works of juridical persons, periods of 50-70 years are the rule. This terms are clearly incompatible with the diffusion of computer programs while they are still economically and technologically valuable. Moreover, the recovery of investments made in the development of a program is often completed in a few years. The extension of the exclusivity would only ensure a monopoly rent for the title holder and prices for users higher than those obtainable under free competition. While adopting the copyright framework, some countries (France, Brazil, Indonesia) have limited its duration to 25 years for computer programs.

4.3. Adaptations

A crucial point for countries which are strongly dependent upon imported software, is to allow some flexibility for adaptation of programs, either to specific types of equipment (this would be particularly important if a local hardware industry is promoted) or to local conditions. The Brazilian law, for instance, stipulates that when provided for in the contract, the rights on the technological changes and adaptations will belong to the person authorized

24. The weakening of the competition that may result from the application of a doctrine such as that held in Whelan is discussed in Bulkeley, 1986.
25. A Swiss governement draft law would propose the same term.
to make them, who will exercise those rights autonomously (art. 6, law 7646).

4.4. Copies

Developed countries' laws tend to restrict the right to make copies. Three main regulatory lines seem to exist:

1) Copies are permitted by law, under specific conditions (USA, France, Japan).
2) Copies need always to be authorized by the proprietor (Germany, France, United Kingdom).
3) Back-up copies are permitted by law, except prohibition by the proprietor (Australia) [Correa, 1988a].

A broader right to make copies may be necessary, however, to reach a balance between the title holder and the user's interests. The diffusion of software may, in particular, be hindered by too stringent provisions on this aspect. The Brazilian law permits the legitimate user to make all copies «indispensable for adequate use» of the program (art. 7, law 7646). The South Korean 1987 law, on its part, allows reproductions for use «for the individual purpose in a limited place like home» and for educational purposes, among others (article 12, law n. 3920, Dec. 31, 1986).

4.5. User's rights

Another important regulatory aspect relates the rights for the continuous use of a program. Since under copyright registration is neither compulsory nor it ensures full disclosure, in certain situations – such as when the title holder has gone out of business or can not be contacted – the user may be in a very difficult position. The South Korean law, in a quite original provision, stipulates that if the owner of the program copyright is unknown and cannot be located, the user may apply to the Ministry of Science and Technology for approval to use the work. In such case, a deposit of compensation for use of the program will have to be made with the Ministry (art. 17). In order to facilitate the access to computer programs art. 18 of that law provides, further, that a program copyright holder must allow a bona fide

26. In the United States, for example, through the CONTU report proposed to allow the right of copying to any «authorized possessor», the law restricted it to any «authorized owner» of a copy [Meisner, 1987, p. 394].
27. Among the comments and proposals made to the Taiwan government request after the amendment of the copyright law in 1983, the establishment of a compulsory licensing system was suggested. «Under such a system, whoever needed a program could use it lawfully at a reasonable price. The software rightsholder could avoid litigation expenses involved in pursuing pirates» [CHANG, 1987, p. 464].
user to use a program which has already been published and distributed unless there is justification for not doing so (art. 18) 28.

On its part, the Japanese law does not deem to be a copyright violation the use of a program for non-commercial purposes when the user does not know about the infringing character of the copy.

As the precedent discussion reveals, the regulation of software protection may - even within the framework of copyright principles - reflect certain policy objectives related to the diffusion or production of programs. How to obtain a balance between the private and public interest, including those of users as well as of local industry, is the crucial point for the formulation of strategies on software protection. It should be clear, in particular, that no general prescription on the matter can be made. There is nothing in the nature of software as an economic and technological entity that would justify a universal approach, independent from the productive and technological development and from the public policy objectives of the regulating country.

Points 4.1. to 4.5. above illustrate some of the ways in which the balance referred to may be struck out. The clear limitation in the extent of protection (the expression and not the ideas or internal software structure), certain flexibility regarding the right to make copies and adaptations, a reasonable duration and the establishment of certain guarantees in favour of users (such as the non-voluntary license provided for in South Korea), are among the elements that may contribute to attain such a balance.

As mentioned before, the number of developing countries that have already legislated on software protection is very limited. In many cases, the issue has not still emerged or gained public attention. In others, studies are only starting at the academic or governmental level. In a third group, finally, pressures by the United States or by organised local associations (mainly those controlled by distributors of imported software) are pushing for the adoption - by legislation, administrative act or jurisprudence - of the copyright approach. In addition, the initiatives of United States and other industrialised countries to define international «norms and standards» within the Uruguay Round include, among other matters, rules relating to computer programs protection under copyright.

In this context, most developing countries will be confronted, in a bilateral or a multilateral framework, with the need to decide on the software protection issue. Considerable room for cooperation among such countries seems to exist. That cooperation may take various forms and imply different degrees of commitment, ranging from coordination to act in bilateral and multilateral negotiations, to the definition of a more substantial common posi-

28. Limitations on the «moral rights» of a program title holder may also be found in the legislation of France [CORREA et al., 1987].
tion. Joint efforts to understand the implications of software protection and to devise the most appropriate legal models may therefore also be fruitfully envisaged.

In sum, the strategic options for NICs and MICs on software protection are limited by the newness of the issue and the ambiguities that still prevail on the form of regulation, as well as by the choice already made by the majority of industrialised countries. In view of the growing unsatisfaction with the parameters and results of protection through copyright, however, the best position for many countries would be just to wait until a more precise picture is available. In fact, no real urgency to deal with the matter – at least from a legislative point of view – would exist in most developing countries, if the main concern is the protection/promotion of local software production. As said before, to the extent that custom – software largely prevails, contract law may be a more effective mode of protection than a general regime.

In the case that bilateral or multilateral pressures make it necessary to produce a more immediate response, it should be clear that copyright is neither the best nor the «natural» solution, and that skillful drafting of pertinent rules may permit to balance the private and public interests involved.

5. MAIN CONCLUSIONS

Any analysis on the software protection issue requires to fully understand the economic, institutional and technological context in which the debate takes place. The study on the world software production market reveals a number of important facts in that respect: its dynamic growth, the overwhelming importance of developed countries as users and producers, the dominant position of United States firms, the high concentration of the supply, and the centralisation of R&D activities, among others. It also indicates that, in contradiction with an extended view, NICs and MICs do not exhibit comparative advantages to successfully compete internationally, or even domestically with imported packaged software. If substantial efforts to improve production and marketing methodologies are not made, the role of such countries in the software area may remain just as an unfeasible illusion.

The consolidation of copyright as the basic approach for software protection, can not be attributed to its appropriateness for the subject matter. It rather shows the power of the software leading country – the United States – to force the adoption of a legal system that basically reflects the interests

29. The so-called «Group of Eight» Latin American countries, for instance, has agreed to coordinate their positions in GATT negotiations on new areas, including intellectual property («Acapulco Declaration», 1987).
of its industry – the most internationalised one among those of the OECD countries. The ambiguities and uncertainty that the application of copyright creates, has promoted the search for alternative forms of protection. Some of those initiatives were abandoned under United States pressure. Others – like the application of patent law or the new approach suggested by OTA – indicate that even within that country the issue is still open to controversy.

Copyright protection of software is generally considered in developed countries as a means of promoting innovation and ensuring a reward for investments made in the development of new products. The attempt to transfer the legislative pattern adopted by such countries to the rest of the world, assumes that a similar legislation will carry out similar effects, independently of the technological and economic context in which it will be applied. It seems clear, however, that the extension of copyright would mainly benefit software exporter firms that operate in a world scale. It is questionable that the protection would foster the diffusion and local software production in all countries, particularly in developing ones.

Diffusion may, in practice, be hampered by provisions such as those concerning adaptations and copying. However, since the total exclusion of protection does not seem politically sustainable, the problem in that respect is how to strike out a proper balance between producer, user and public interests.

From the point of view of production, local firms have not too much to benefit from protection if they are basically involved in the development of custom software, for which contractual law is the main means of protection. The production of packages may introduce a different picture, since it is not possible to compete with a low cost «pirate» industry. In any case, the impact of the legislation will depend on the segments in which local productions will compete and on the terms under which the protection is granted.

It is clear, on the other side, that the mere protection is not sufficient to promote and give viability to a software industry. Other specific policies may be necessary in order to overcome the often serious obstacles that NICs and MICs face in this sector.

Finally, to the extent that the question is not whether to grant protection or not, but what type of régime is best and when should it be implemented, the regulation of different aspects (scope of rights, duration, etc.) particularly relevant. From a technical point of view there is considerable room to frame a legal régime that takes into account specific diffusion or productive objectives, and which pursues a balance between public and private interests. The foreign policy implications of such a national decision on the subject are, of course, a different matter.
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