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THE IMPACT OF PROTECTION OF NON-ORIGINAL DATABASES ON THE COUNTRIES OF LATIN AMERICA AND THE CARIBBEAN

Study prepared by Mr. Andrés López,
Head Researcher at the Center for Research on Transformation (CENIT)
and Professor at the University of Buenos Aires (UBA)

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SUMMARY OF THE STUDY

In the scenario of the transition to the "knowledge-based economy," it comes as no surprise that the debates on the subject of intellectual property rights (IPRs) have expanded to a vast extent, not only in the main developed countries but also in the international negotiating arena.

One of the debates has to do with the problem of protecting "non-original" databases, namely those that do not meet the criterion of originality in the selection and/or arrangement of the data, which would make them eligible for protection under the TRIPS Agreement (Agreement on Trade-Related Aspects of Intellectual Property Rights) and the WIPO Copyright Treaty.

The aim of this study is to examine the debate on non-original databases from the point of view of the countries of Latin America and the Caribbean. It therefore considers the possible impact, in a broad sense, of the introduction of IPRs in such databases, bearing in mind the different levels of economic development, needs and interests of the nations in the region.

Today, legal protection for non-original databases only exists in the European Union (EU), Mexico and some Nordic countries. In the United States of America (USA), various bills have been put forward on the subject, although none has been approved by the national legislative authorities, largely due to opposition both from the scientific and academic communities–citing restrictions on the free circulation of data which characterizes research activity–and from various companies in the telecommunications and IT sectors, as well as others that generate added-value services based on primary information. An attempt to have a treaty signed on the subject within the WIPO framework, which the USA and the EU had been pressing for, likewise failed to prosper.

This is a key theme in that it relates directly to the conditions in which information, the value of which as an economic asset continues to grow, is generated, circulated and appropriated. But the question clearly goes beyond economics in the strict sense, as information increasingly becomes not just a key input for competition in the market but also a factor of social and cultural progress. In this scenario, the problem is how to achieve the difficult balance between the need to stimulate the generation and availability of information, with the clear social and economic benefit that that brings, and at the same time guarantee that the information brings the greatest possible number of external benefits (or spin-offs), which entails encouraging its spread and use.

Probably the strongest argument against introducing a *sui generis* regime for non-original databases similar to that introduced in the EU in 1996 is that such a regime would be designed to protect not the databases themselves as new and/or creative products, but rather the information embodied in them, with the attendant risk of limits being set on the latter's circulation, including that of information that hitherto has remained in the public domain. In other words, the creation of new IPRs for databases could upset the balance between protection and dissemination, tipping it dangerously towards the former. The threats in the latter eventuality are to be seen not only in the highly-sensitive areas of science and education, but also in the commercial field itself against the background of the development of the Internet, for instance.

Another key point is that such a regime would not be directed towards generating new ideas or goods or even creative effort but rather, basically, towards investment in the collection

and organization of information of various kinds. That in principle would run counter to both the tradition of copyright legislation in most parts of the world and the objectives that should underpin IPR regimes from an economic point of view. Also, at least in the form in which the *sui generis* regime has been introduced in the EU, there would be the potential risk of generating perpetual protection (which is at variance with the idea of temporary protection underlying all intellectual property legislation).

It is therefore no surprise to find that even in developed countries–the main producers and consumers of databases–there is a vigorous discussion going on around the usefulness of adopting *sui generis* legislation of the type implemented in the EU.

Far more doubts arise in the case of developing countries since, given that they are at present mainly consumers rather than producers of databases, the adoption of international disciplines would appear to generate an even less favorable cost-benefit balance than in the advanced nations.

The empirical evidence that we have collected for Latin America and the Caribbean, in its turn, does not seem to support the argument in favor of introducing IPRs for non-original databases, in that we have not observed that the incipient industry existing in the region, apparently concentrated in the more advanced countries, is being damaged by the absence of *sui generis* legislation; the commercial damage that certainly is done, although its extent is not clear, seems to derive more from the lack of adequate enforcement of the legislation currently in existence. So there does not appear to be a definite economic or social interest at present, from the point of view of the countries of the region, in international legislation on non-original databases on the lines of that proposed years ago within WIPO.

All this should not however be interpreted as meaning that the current situation is in any way ideal. It is clear on the one hand that, in spite of the existence of both legislation and technological means that could protect investment in the creation and maintenance of databases, there are problems not only with the enforcement of relevant contracts and laws, but also with the "circumvention" of technological protection measures, all of which inflicts monetary losses on database owners (not only operating in the private sector but also, in many cases, being State bodies).

It could in turn be expected, from a dynamic point of view, that the database industry in Latin America and the Caribbean will grow over time–especially as information and communication technology (ICT) penetration in the region increases –with the result that disputes of greater significance than those experienced up to now could arise in the future.

Consequently, it is necessary for the study of this issue to progress further. It would be important in particular to have definite economic information compiled in the future regarding the scale of the industry in our region. While that is a complex task, as evidenced by the very scant information available on the subject, even in developed countries, it is clearly essential if the debates on the subject are to be settled on a firmer empirical base.

That said, it emerges from our study that two steps potentially conducive to the development of the database industry in Latin American and Caribbean countries would be:
(i) to improve the enforcement of the provisions currently in force on the subject, both in the field of copyright and in the other legal areas involved (unfair competition, etc.); and
(ii) to promote a stronger ICT presence in the countries of the region.

As for the future, a start should be made on a process of dialogue among the various parties interested in the subject in order to determine the extent to which it might be necessary to reform current unfair competition legislation, for instance, in order to provide more effective protection for the owners of databases in the region. Further consensus could then result from that dialogue on whether or not it is necessary to consider some kind of database protection by means of IPRs–and on what forms such protection would take in the event of a favorable response to the proposal–including in the multilateral framework, for which reference would be had both to accumulated experience of the implementation of provisions already existing in certain regions and to the actual evolution of the database market in Latin American and Caribbean countries.

I. INTRODUCTION[1]

At present, the world seems to be undergoing a transition to the so-called "new economy," a term often applied rather vaguely, but which basically relates to the rapid mass spread of information and communication technology (ICT). While debate rages over the real impact of that technology on the economy as a whole–in particular where the United States of America (USA) is concerned (see Gordon, 1999, 2002; Crafts, 2000; Baily, 2002)–there can be little doubt that they have brought about significant structural changes that have a direct impact on corporate strategy, organization of markets, patterns of consumption, etc. (Shapiro and Varian, 1999). Similarly, significant business and investment opportunities have been opened up, both in new sectors and in traditional activities that are transformed by the spread of ICT.

The "new economy" is said to be "knowledge-based" or "knowledge-driven" (OECD, 2001; David and Foray, 2002). In other words, knowledge is said to be the key input of competition in markets, as well as the main factor in the growth of national economies.

Against this background, it is no surprise that disputes–academic as well as political–on the subject of intellectual property rights (IPRs) have become widespread, both in the main developed countries and in the arena of international negotiations. Take, for example, the arguments over the patenting of software, living organisms and business methods, as well as the debates over IPRs and biodiversity.

It is against this background that one has to look at the argument over the protection of non-original databases, namely databases that do not fulfil the criterion of originality in the arrangement and/or selection of data that would make them eligible for protection under the provisions of the TRIPS Agreement (Agreement on Trade-Related Aspects of Intellectual Property Rights), concluded in 1994, and those of the WIPO Copyright Treaty, adopted in 1996.[2]

There are three particular defining moments in this debate: (i) the decision of the Supreme Court of the USA in 1991 in the so-called "Feist case," which established that non-original databases were not protected by copyright in that country; (ii) the adoption by the European Union (EU) of a Directive in 1996 which established *sui generis* protection for non-original databases; and (iii) the collapse in 1996 of a treaty on the subject within the framework of WIPO, which had been promoted by the USA and the EU.

Today, legal protection for "non-original" databases only exists in the EU, Mexico and some Nordic countries.[3] In the USA, various bills have been put forward on the subject,

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[1] The author is especially grateful for the very valuable contribution of Ariana Sacroisky in the preparation of this study.

[2] It is important to clarify that the protection granted under the provisions of these agreements does not in any circumstances extend to the actual data or material *per se* contained in the protected databases or compilations.

[3] It is worth pointing out that there is no universal consensus on the definition of "databases". Moreover, while in a number of works the subject is treated solely from the perspective of computerized databases, the relevant European legislation also includes physical databases. Some authors have therefore suggested that any collection of items–for example, a museum–could fall within the definition of databases in the above-mentioned EU Directive (Lipton, 2002). We will return to this subject later.

although none has been approved by the national legislative authorities, largely because of opposition both from the scientific and academic communities–citing restrictions on the free circulation of data that characterizes research activity–and from various companies in the telecommunications and IT sectors, as well as others that generate added-value services based on primary information who could see their businesses adversely affected by the strengthening of IPRs in the information contained in the databases in question.

This is a key theme, in that it relates directly to the conditions in which information–which plays an essential role in the "new economy" scenario–is generated, circulated and appropriated. But the question is clearly more than a narrow economic one, since information increasingly becomes a key input not only for competition in the market but also for social and cultural progress. In this situation the problem is how to achieve the difficult balance between the need to stimulate the generation and availability of information, with the clear social and economic benefit that that brings, and at the same time guarantee that the information generates the greatest possible number of external benefits (or spin-offs), which entails encouraging its spread and use.

The aim of the present study is to examine the debate on non-original databases from the point of view of the countries of Latin America and the Caribbean. It therefore considers the possible impact, in a broad sense, of the introduction of IPRs in such databases, taking into account the different levels of economic development, needs and interests of the nations in the region.

With that in mind, the first section deals with the main conceptual arguments for and against introducing IPRs in non-original databases, with particular reference to developing countries. In the second section we look at the current state of the legislation on the subject at an international level, with emphasis on European legislation. The third section examines the evidence gathered in the case of the countries of Latin America and the Caribbean in relation to the market, the main suppliers and the levels of protection currently in existence for non-original databases. Finally, we present the main conclusions and recommendations of the study.

Before addressing the subject, it needs to be clearly stated that it is difficult for an economist, such as the author of this study, to assess the potential impact of a legislative change regarding IPRs without having at least a minimum of firm economic data on the subject. Regrettably such information is completely lacking in this instance, a fact that affects not only this study but also all the many others that we have consulted, since, as far as we know, there are no figures that would allow the size of the database market in economic terms to be ascertained in any country other than the USA, and even then, only up to 1997.[4] So an initial recommendation would be to try, with the help of the database industry and the governments concerned, to obtain firm data on the economic dimension.

[4] According to the United States Economic Census, the "*Database and Directory Publishers*" sector in 1997 comprised 1,322 companies, employed 43,100 people and had sales of US$12.258 million.

II. THE CONCEPTUAL DEBATE

(a) The appropriability-dissemination dilemma in intellectual property regimes

From the point of view of the economy, IPRs must be seen as a system of incentives intended to promote the creation of new objects, knowledge and ideas, so as to grant to their creators a monopoly right allowing them to secure extraordinary income from the commercial exploitation of their creations and/or innovations.

As Jeremy Bentham observed some 200 years ago when discussing the usefulness of patents, IPRs are monopolies that encourage the production of things that, were it not for the promise of exclusive appropriability by virtue of IPRs, would probably never have been created. Bentham also highlighted the temporary nature of the monopoly, which, once the period of exclusivity granted to the innovator had passed, allowed other members of society to devote themselves to producing–or reproducing–the same type of good that the innovator had created (Bentham, 1978). At about the same time, Thomas Jefferson succeeded in capturing the social benefits that could come from the free dissemination of ideas, in that they have properties that are clearly different from other economic goods: "... If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. …That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe ... incapable of confinement or exclusive appropriation" (quoted in David, 2002).

Although both the reality of economic and social life and the theoretical analysis have become much more complex in the last two centuries, the essence of the arguments of Bentham and Jefferson is plainly still valid: (a) knowledge (taken in a broad sense, including innovations, artistic works, ideas, etc.) is, in economic jargon, a "non-rival" good (that is, a good the consumption of which by a person does not limit access or use by other consumers); (b) once knowledge has been disseminated, it becomes difficult or impossible–unless legal or other barriers intervene–to prevent others from exploiting it (in economic terms, knowledge is a good in which exclusion is imperfect, since it is difficult to prevent its use by those who do not wish to pay to gain access to it); (c) free dissemination of knowledge is beneficial to social and economic progress, in that it contributes, *per se*, to the creation of new knowledge; (d) intellectual property rights are monopolies that are granted in exchange for the creation of new things; (e) the protection that they grant must be temporary.

From this set of principles it is fairly clear that it is a serious mistake to discuss intellectual property by mechanically transferring the same arguments with which economic theory analyzes, say, the production of wine. To do so can only lead to false conclusions, in that it does not adequately recognize the uniqueness of ideas as economic goods different from others.

On this point, the first thing to bear in mind, as Romer points out (1993), is that knowledge, being a non-rival good, has an opportunity cost of zero. It is also characterized by having generally high fixed production costs–in the case of technology, for example, R&D

costs–and very low reproduction and distribution costs, a fact which consequently generates substantial economies of scale. In this scenario, the linking of base prices to marginal costs and the existence of markets with perfect competition–two assumptions traditionally used in conventional microeconomics–clearly cannot be the base on which to discuss the topic before us. In contrast, what tends to happen is that prices are set as a function of the usefulness to the consumer (price elasticity of demand)[5] and the markets are characterized either by a "dominant firm" model or by the existence of significantly differentiated offerings ("imperfect" competition)–Shapiro and Varian, 1999. On the other hand, it is generally relatively simple to copy and/or exploit ideas or innovations of other economic agents; in other words, it is difficult in a free market situation to guarantee complete appropriability of knowledge for its creators. The spread of ICT–the Internet is the most obvious case–has made it easier particularly to copy artistic works, information, etc., and that goes some way towards explaining the extent of the discussion in recent years on IPRs worldwide.

In this scenario of incomplete appropriability, intellectual property would appear to be one means of guaranteeing an adequate level of "supply" of knowledge and innovations. We say, however, that it is only one of the means of achieving such an objective, since there are "market" mechanisms (commercial secrets, lead times, sales and after-sales services, trademarks, etc.), as well as public policy mechanisms (subsidies, public contracts, etc.), that can complement or replace IPRs (see Levin *et al.*, 1987; David, 2000).

However, bearing in mind the objective of our study, we will concentrate here on the discussion concerning IPRs. In this regard, it is vital to take into account that, as has been repeatedly pointed out in the literature received, there is a tension between the need to create sufficient incentives for ideas, innovations, artistic works, etc. to be generated, and at the same time, to guarantee the widest possible dissemination of those goods. On this point, a number of authors have highlighted that the mechanisms to stimulate the dissemination and use of new knowledge are just as important as the incentives for generating it in the first place. This is because the process of innovation is generally cumulative, in the sense that knowledge is the main input for generating new knowledge (Foray, 1997; David, 2000; Scotchmer, 1999). This is an important point, since although it is possible to think in terms of contracts that take account of the problem of cumulative innovation, the drafting of these contracts can be difficult, given the possible existence of high transaction costs.

On this point, according to Hall (2002), it is useful to distinguish between processes of R&D–or artistic creation –that give rise to the production of goods which are then marketed separately, and other cases in which it is the knowledge itself that is marketed (for example, software or databases). While in the former case it is possible for the knowledge embodied in the protected products to be disseminated–via open information in patents or reverse engineering, for example–in the latter case private provision implies that there will inevitably be some limitation on the dissemination of knowledge if IPRs exist.

A second point of tension comes from the fact that IPRs consolidate monopoly situations in which, in a static analysis, the consumers transfer a surplus to the producers, given that the prices are higher and the quantities lower than those in a situation of free competition, with the consequent loss of efficiency and welfare. However, that static inefficiency must be weighed against the positive dynamic effect of the fact that the rate of innovation would probably be less

[5] The theoretical reference base is the so-called "Ramsey prices" (see David, 2000; Braunstein, 2002).

in a world without intellectual property regimes, with the consequent adverse effects both on the rate of economic growth and on the generation of socially useful new objects, knowledge, ideas, works, information, etc.[6]

On these grounds, it is logical for intellectual property regimes–complemented by other areas of public policy, such as protection of competition, for example–to be aimed both at limiting possible abuses arising from the exploitation of the monopoly rights that they confer, and at promoting the dissemination and use of the knowledge, ideas and creations to the generation of which they contribute.

Thus a patent regime is a means of protecting an invention, but it also presupposes the dissemination of information in exchange for that protection, which information can then be used by other economic agents. In the case of copyright legislation, it is the "expressions" that are protected and not the "ideas," which stay in the public domain. Also, both the patent systems and the copyright legislation grant protection for limited periods, and contain certain exceptions or mechanisms that tend to favor dissemination and/or limit the appropriability of the innovators in certain circumstances (for example, copying for personal use or the notion of "fair use"[7] in the case of copyright or compulsory licenses and exceptions–such as those intended for research activities–in the case of patents).[8] Let us now see how these principles apply to the case at hand.

(b) The pros and cons of non-original databases

As mentioned previously, there is no uniform definition of what is meant by databases from the legal or economic point of view. It is interesting to highlight that the definition in European Directive 96/9/EC, article 1.2, is extremely broad, characterizing a database as "a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means."

Taking this "broad" approach, databases even extend to telephone directories or university courses, including things as diverse as genetic or satellite information banks, dictionaries, meteorological records, horse racing results, TV program guides, collections of legal, commercial or financial information, newspapers, libraries (both "physical" and digital), company brochures, medicinal *vademecums*, compilations of natural or experimental observations in the fields of physics, chemistry, biology, etc.; indexes made by Internet search software agents may also come under this definition. As Maurer pointed out (1999), this makes

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6 It is important to note that in recent years a body of evidence has been gathered which has cast doubt on the general effectiveness of IPR as a means of stimulating innovation. In fact, economic theory suggests that only in certain circumstances are IPR the best mechanism for incentivizing R&D, and even when they are, their optimal design, in terms of scope and duration, will depend on a set of factors specific to each particular situation in which they are to be applied (Gallini and Scotchmer, 2002).

7 By virtue of fair use, the reproduction of a work for purposes of criticism, comment or news reporting, or for academic or educational purposes, does not constitute a breach of copyright. For a discussion on the scope of fair use in the era of digital technology, see Correa (2001).

8 Recent court rulings have confirmed this logic, for example, the acceptance by the courts in the USA in the 1990's of the validity of reverse engineering activities on software programs (Samuelson and Scotchmer, 2002).

discussion of the whole subject of database protection difficult, because of the great variety of items included under the term.[9]

Over and above the need to take account of this not insignificant problem, we will now set out the main arguments for and against establishing IPR for "non-original" databases.

The arguments in favor

A review of the literature received leads to the conclusion that the most important argument put forward by the majority of studies and analysts favoring "strong" protection for non-original databases is based on guaranteeing an appropriate return on the often substantial investment needed to create, maintain and update their content. Without adequate protection, so the argument goes, the production of databases would be less than that which is socially desirable. This protection would be all the more necessary in a situation where digital and information technology make it easy to copy and distribute the contents of databases without the permission of the owners (see Braunstein, 2002; D'Andrea Tyson and Sherry, 1997).[10] In turn, still following this argument, the need for an international treaty arises from the requirement to harmonize the various different ways the subject is handled in different countries, so as to guarantee the free circulation of information at a global level and contribute to the better protection of investment that it aims to promote.

In this line of reasoning, there is no insistence on the originality or novelty of the databases concerned, since if they were to have such attributes they would fall under the protection already granted by copyright legislation in the countries that have adopted the provisions of WIPO and TRIPS on the subject, but purely on the investment[11] made (in legal language, the usual terms are "sweat of the brow" and "industrious collection").

The arguments against

– Conflict with the assumptions on which IPR legislation is traditionally based.

Attempts to introduce greater protection for databases through intellectual property regimes would prove incompatible with the assumptions on which the existence of such regimes is based, namely, as we saw earlier, the promotion of creativity and the generation of new objects (see, for example, Dussolier *et al.*, 2000).

– There is no empirical evidence that the database industry has been damaged by the lack of a specific intellectual property regime.

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9 This extension of the term makes it even harder to make accurate estimates of the size of the database industry, in that it would include goods and services which are completely dissimilar and which originate from very different sectors of activity.

10 New technologies, while facilitating the creation of databases, exacerbate the "market failings" which arise from the difficulty of preventing the use of these databases by those who do not pay for them (Baron, 2001).

11 This forms part of a more general trend that is also seen in other areas of intellectual property (Dussolier *et al.*, 2000).

In this respect, it is argued that (i) the supply of databases, both public and private, is not only sizeable, but has been experiencing sustained growth in recent years, without there being–at least until 1996 and as yet only in the EU–any special protection regimes;[12] (ii) no one has managed to demonstrate a single actual case where insufficient protection caused certain databases not to be developed;[13] (iii) following approval of the EU Directive on the subject, the database industry in Europe does not seem to have demonstrated any clear growth trend;[14] (iv) movements in the share price of companies in the sector shows no sign that the profitability of the business is falling in the USA, in spite of the apparent lack of protection (Band and Gowdy, 1997; Oram, 2000; Baron, 2001; Maurer, 1999; Maurer *et al.*, 2001; Hughes, 2002). In any event, as far as these arguments are concerned, and whatever their relative merits, it is worth repeating that there is no empirical evidence to determine the real size and rate of growth of the database market, measured in monetary terms. Therefore any discussion in this area has to be viewed as provisional.

– There are already legal and technical mechanisms in existence that give adequate protection to database owners.

There are already legal instruments available (unfair or "parasitic" competition, enrichment without cause, undue appropriation, etc.) that can offer reasonable protection to owners of non-original databases.[15] Moreover, some authors suggest that if there is a need for greater database protection than currently exists, it could be achieved through changes to the legislation on unfair competition[16] or undue appropriation, for example, which would protect the database owners against piracy on the part of their competitors[17] without affecting users' access to the information, a particularly sensitive subject in such fields as education or science (Dussolier *et al.*, 2000; Reichman and Uhlir, 1999; Maurer *et al.*, 2001). Recourse to

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12 According to David's figures (2000), following the *Feist* case the database industry experienced sustained growth in the USA. Between 1991 and 1997, the number of databases grew by around 35% and the number of archives in them increased by some 180%. On the other hand, while in 1977 78% of all databases were produced by government, academic or not-for-profit organizations, by 1997 the private sector controlled 78% of the industry (against some 70% in 1990).

13 Maurer (1999) points out that the company Elsevier has argued that on occasions its non-scientific divisions have decided not to invest in new databases because of concerns relating to protection of their contents. However, according to the author, the subject of protection has been one of the elements, but not the only one, behind such decisions. Maurer also points out that the scientific divisions of Elsevier have not reported similar cases of non-investment due to the fear of unauthorized copying of information.

14 Maurer *et al.* (2001) present evidence to this effect, contradicting the statements made by some EU officials. However, the discussion is based on the number of databases created annually in the region; if this figure reflects a similar trend in terms of the economic size of the business, it can clearly only be coincidental.

15 See Peters (1999) for a summary of the characteristics of the various legal remedies available–or which might be applicable–for protection of databases.

16 The original idea before the adoption of Directive 96/9/EC was precisely to modify the legislation on unfair competition as a means of protecting investment in databases. De Oliveira Ascensao (2002) attributes this change of direction mainly to the fact that Great Britain and Ireland do not have legislation on unfair competition.

17 On this point, although it is not always easy to demonstrate that a person has copied a database belonging to someone else, there are some practical measures which can help to protect the original creator, for example, introducing deliberate mistakes (see Losey, 1995).

contracts or to the concept of business secrecy are other options available to protect the content of non-original databases.

There are also electronic mechanisms–copy indicator, encoding, authenticator, water marks, encryption, passwords, etc.–that contribute to the goal of providing protection for database owners (according to Baron, 2001, certain techniques currently exist to track the use of any portion of information extracted from a particular database).[18]

Other "defensive" strategies that have been suggested are the inclusion of the contents of copyright-protected material (such as software programs that increase database utility), continual updating of the contents of the databases and, lastly, the application of sufficient creativity to merit protection under copyright legislation (Maurer, 1999; Nicholson and Freno, 2001).

– The database industry by its nature tends to be monopolistic, with major barriers to entry that provide database owners with adequate protection.

The production of databases is characterized by significant economies of scale, high entry costs and a consequent tendency towards natural monopolies, in which specialist suppliers dominate specific sectors. Reichman and Samuelson (1997) further add that the data to be protected are often not available through other public sources and the creation of a complex database appears to constitute a "de facto" barrier that is difficult to overcome. Moreover, there are databases that by their nature are unique (meaning that they cannot be reproduced independently by third parties–for example, climatic data, but also other data of a commercial or economic nature), for which reason the possibility of a monopoly is obviously greater (Riis, 2002).[19, 20] In this regard, the legal and technological instruments described above would in themselves–and without any additional rights–still give more than adequate protection to database owners (Baron, 2001).

– A serious threat to free circulation and use of the information could be created, which would be damaging not only to research activities and the preservation of the public domain, but also to a great many private commercial activities.

Without doubt the harshest and commonest argument against introducing IPRs in non-original databases is that, by going down this route, we could end up by protecting, and creating private rights in, the information contained in these databases. This could seriously damage the preservation of the public domain in the key fields of scientific, educational and

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18 See Stefik and Lunt (1999) for a summary of the technological protection measures available.

19 Maurer (1999) points out that the evidence from a market "close" to the database market, namely scientific journals, confirms the fears over the tendency towards monopolization. The *Association of Research Libraries* notes that the prices of such journals rose by some 115% between 1986 and 1994, the result of a market in which competition is monopolistic and controlled by a small group of publishing houses.

20 NAS (1999) points out, for example, that although the financial market is not a natural monopoly, the people that publish the information are also those who create it. The share market would appear to be a case where it is very easy to maintain a monopoly, since although a person could call all the quoted companies, it would be prohibitive in cost terms to collect the information, as compared to what it costs the *Bolsa de Valores* [Stock Exchange], since that is where such transactions take place.

legal[21] information, among others (Maurer and Scotchmer, 1999; Dussolier *et al.*, 2000; David, 2002; Reichman and Uhlir, 1999).

The academic community therefore fears that IPRs in databases create an obstacle, through price rises and/or private appropriation, to the free circulation of ideas and information that has been the norm in the advancement of science over the last two hundred years. It is therefore no surprise that such significant institutions as the *National Research Council*, the *National Academy of Sciences*, the *National Academy of Medicine*, the *National Academy of Engineering*, the *National Science Foundation* and the *National Institute of Health* are among the most prominent opponents of any legislation that might restrict access to data or information in the USA.

David and Foray (2002) point out that those who argue for strengthening of IPRs in knowledge–in this case, databases–omit the crucial fact that knowledge is not a consumer good, but, as we saw earlier, a production factor. Moreover, knowledge is not just a non-rival good, but its social benefit normally increases the more it is disseminated. So, when the use of a given database is restricted–for example by making a researcher pay to access it–it is likely that this creates an obstacle to the advancement of science, because it is feasible that, in the face of the additional cost, the researcher will restrict his searches to the topics that he already knows, thus limiting the unexpected discoveries that are common–and frequently very important–in the scientific sphere. It has also been argued that scientific advancement increasingly depends on the ability to combine data from different sources–as in the case of biotechnology, for example; the introduction of greater property rights in this area would therefore certainly imply an obstacle to the progress of research (giving rise to what one author called "the tragedy of the anti-commons,"[22] David, 2000).[23] Another factor that adds to the concerns is the existence of so-called "pass through rights"–which introduce new restrictions on the use of the contents of

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[21] On this point, Jaszi (1996)–quoted in Barca (2000)–proposes the following example, applicable to the USA, regarding the potential risks of creating a *sui generis* right for databases. According to the author, "up to now, the public information essential for the practice of law is in the public domain under the law of copyright. Some information is only available through private companies that collate decisions of the courts, legislation and regulations… Today a lawyer or researcher must buy books or CD-ROM's, or subscribe to online services, in order to have access to the law in general. Despite this, the legal principle of *copyright*, under which the legal protection does not extend to information, … operates in such a way as to confirm the monopolistic tendencies inherent in this situation. Once accessed, there are no restrictions on how the public information extracted from electronic or paper-based databases can be used, in that the value added by the compiler is not extracted … (in the case of approving a *sui generis* right) ... the situation ... would be different. Unlicensed reproduction or other use of the text of any legal decision, if it were considered qualitatively substantial, would be sufficient for the user to be made liable, and possibly also the educational establishment or library through which the user accessed the database".

[22] The "tragedy of the anticommons" occurs when many individuals have rights of exclusion in a scarce resource. As a result, in acting separately they can cause a collective squandering of the resource by under-utilising it vis-à-vis what would occur in a socially optimal situation (Heller, 1998).

[23] An interesting example of these tensions is raised by one particularly hot topic, that of genetic and medical databases. Some countries, such as Iceland and Tonga, have granted exclusive licences to private biotechnology companies to exploit genetic and medical data of certain populations, which implies the privatization of data that were hitherto freely exchanged within academic circles (see Cassier, 2002).

databases–since they extend to all potential uses of these contents (Maurer *et al*., 2001).[24] In this scenario, it is feared that the need for multiple licensing contracts for the use of data incorporated in the various databases would make modern scientific research very difficult, given the enormous transaction costs involved.

It has also been pointed out that the increase in the costs of accessing databases can cause a chain reaction within the scientific community, in that the users in their turn will seek to compensate these higher costs with new sources of revenue based on the results of their research. It would be precisely in the areas of greatest immediate importance to society or science that this could occur soonest (Schrader and Jeweler, 1999). At its most extreme, the introduction of IPRs in this area could bring about the end of scientific cooperation and the "open science" model (Granstrand *et al.*, 2001; see also Baron, 2001).

These concerns increase when universities and research centers in Europe and the USA come under pressure–for fundamentally budgetary reasons–to increase their revenue from sources other than the public purse. This encourages the trend towards trying to obtain resources from patenting and other means of exclusion of their research results.[25] The same reasons have also led to an increased private involvement in the collection and generation of data, causing an increase in fears over private ownership of information in the public domain (Linn, 2000).[26]

Purely for the purpose of illustrating some of the potential problems that could arise from *sui generis* protection for non-original databases, it is worth citing Cowan and Harison (2001), who note that the publishers of scientific journals increasingly digitize their contents, which is also convenient for the university libraries that are the main customers of such journals (for essentially "logistical" reasons). The problem is that the libraries do not then buy the journals as such, but buy access to the databases of the publishers; by virtue of that change, the articles contained in these databases are not covered by fair-use exceptions that would allow, for example, an article to be photocopied (whereas now a researcher who is a legitimate user of the database could be prohibited from sharing an article with a non-authorized colleague). Maskus (2000) raises the same issue, but from a more general perspective, pointing out that it may be impossible for a researcher who buys access to a database to share the data with other colleagues.

However, the fears over the impact of greater database protection also extend to the field of commercial users. Thus it is pointed out that this would impede the development of activities in which the primary information is re-used or converted, or would result in an increase in the costs of these activities (Schrader and Jeweler, 1999).[27]

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[24] One of the most often cited cases in this area is that of a database originating in Switzerland on the sequence of proteins called Swiss Prot, the use of which was restricted precisely by "pass through rights" limitations. The case of a similar database originating in the USA, called Scop, is also mentioned.

[25] On this point, it has been mentioned that towards the end of the 90's, a German firm was trying to obtain an exclusive right from the European Molecular Biology Laboratory (EMBL) to commercialize part of the data generated by EMBL, a step which was apparently aimed at promoting the development of the biotech industry in Germany (NAS, 1999).

[26] Reichman and Samuelson (1997) observe that when the commercialization of images from the Landsat satellite in the USA was privatized, prices rose from $400 to $4,400 per image.

[27] It should be pointed out that the majority of bills introduced to improve database protection in the USA also encountered opposition from software and Internet companies; the same was true of

[Footnote continued on next page]

For example, software development activities could find themselves under threat. According to El Kassas (2002), too broad a definition could give protection to look-up tables, sets of instructions and characters, etc., which are necessary in developing computer programs. Problems could also arise for the advancement of the Internet, in that the linking tables and directories, as well as search services and domain name systems, could also fall under the database legislation. Internet service providers could be affected, therefore, by the possible unauthorized transmission of the data contained in protected databases (El Kassas, 2002; Shengli, 2002).

In this scenario, there is sufficient consensus to propose that information and added values developed with public funds directly by government offices and/or their contractors should in general be protected by copyright or related rights, and that there is a need for fair-use clauses and others that minimize the impact on scientific and educational activity, or else that a model of compulsory licenses or differential prices for these activities be created[28, 29] (Hughes, 2002; Riis, 2002; Colston, 2001; Maurer, 1999; Reichman and Samuelson, 1997).[30] Some authors also suggest that any protection of databases should not extend to databases already in existence, particularly when dealing with information that is already in the public domain (Gilbert, 1999).[31]

Questions raised by the arguments against

– Although the database industry has been growing in recent years, it could have developed even faster in a favorable legal environment (D'Andrea Tyson and Sherry, 1997).

– The application of legislation on the protection of competition is inadequate, because: (i) it generates a high degree of litigiousness; (ii) it only resolves the problem of undue appropriation by competitors, but not by users; (iii) it does not resolve the problem of so-called "information Samaritans," *i.e.*, people who for "non-economic" reasons appropriate data and make them freely available to the general public; (iv) recourse to unfair competition is only available *ex post* the effects of the harmful conduct, so provides a low level of legal safeguard; (v) unfair competition regulations, unlike the situation with a *sui generis* right, do

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[Footnote continued from previous page]

telecommunications companies, as well as companies further downstream in the data generation chain (such as Bloomberg) and the Direct Marketing Association (Band and Gowdy, 1997).

28 On this point it is important to bear in mind that price differentiation, in order to be effective, has two conditions: i) that price elasticity of demand in the scientific sector is greater than in the commercial sector–which is not the case when the information in question is key to the particular research task, and ii) that there is a sufficiently broad commercial demand for the type of information demanded by the scientific community (Hall, 2002).

29 David (2000) suggests that it would also be possible for differential prices to be applied to any user who gets involved in distributing data that he generates on databases similar to those that he has obtained.

30 Riis (2002), for example, proposes a distinction between databases (such as court rulings) that relate to the "information infrastructure" of a society, and those that are commercial in nature. Although this distinction will not always be easy in practice, there should be different approaches to the two types of database, in that access to the former should be as free as possible.

31 The version of the WIPO treaty submitted for consideration in 1996 did not require the databases in question to be registered, for which reason, *de facto*, the protection would extend to databases already in existence.

not confer an exclusive and transferable right; (vi) the concept of unfair competition does not appear in all national legislation and/or its application varies from country to country. Contracts are also not an effective substitute for IPRs, since there are difficulties in monitoring and effectively enforcing them, especially when the party in breach is not the one with whom the database owner concluded the contractual arrangement, a situation which causes high transaction costs and raises doubts over the real effectiveness of this mechanism (Millé, 1999; Howell, 1998; Barca, 2000; Cámara Lapuente, 1999).

– As to the possibility of obtaining copyright protection as a function of the originality and/or creativity of the databases, it is claimed that many of them are by their nature exhaustive–for which reason they cannot aspire to being original from the point of view of the selection of elements–and that in some cases, particularly when dealing with electronic databases, there cannot be original arrangements, since it would be the users, through the variations that can be generated by search engines, who would determine, *ex post*, the original sorting criteria according to their requirements.[32] On the other hand, it is pointed out that the protection granted by virtue of the criteria for selecting data can be nullified if various databases intersect, giving rise to new and different compilations (Páez Mañá, 1997).

– As for the technological means of protection, it is argued that they are still not sufficiently reliable, and that they can be circumvented in a number of ways.[33] It is also pointed out that without legal protection, the producers of databases will not be able to offer their products in easily-accessed formats, and at the same time will have to bear unnecessary additional costs, specifically because of the need to apply sophisticated means of technological protection (D'Andrea Tyson and Sherry, 1997).

– There is no evidence that the database market is monopolistic, even in niche segments (D'Andrea Tyson and Sherry, 1997). On the other hand, database suppliers in practice generally have differential prices for certain customers (universities, for example); it is argued therefore that if adequate protection is not granted, database manufacturers will have to charge higher prices to existing users, including universities (ITAC, 1997; D'Andrea Tyson and Sherry, 1997). The latter authors suggest that if there is a desire to allow certain communities preferential access to the information, the preferable alternative is direct subsidy (see also Braunstein, 2002, who argues against compulsory licenses and exemptions). In turn, in cases of a single source, it is suggested that anti-monopoly legislation should be applied. In our judgement, on the balance of the debate described above, any benefits from establishing a *sui generis* IPR regime for non-original databases probably do not compensate for the risks that would arise from such a regime. However, it should be stressed that in general, none of the authors who concur with this view disagree over the need to have a framework of incentives that allow a sufficient rate of creation and maintenance of this type of database. The discussion therefore centers on knowing whether this framework requires the introduction of new legal instruments, and if so, in what form these instruments would be introduced in order to generate

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[32] In fact, when trying to determine in practice whether or not a given database has the characteristics of originality required by copyright legislation, arguments can arise in specific cases in which these characteristics are debatable.

[33] On this point, it is interesting to consider that the so-called *Digital Millennium Copyright Act*, passed in the United States in 1999, among other provisions, prohibited from the year 2000 onwards the use of any mechanism designed to avoid or circumvent the access control technologies used by the owners of works covered by copyright as a means of protecting their works.

the least possible cost in terms of restrictions on the dissemination of information and knowledge. On this point, we will look later at the current state of legislation on this topic at an international level. Before that, though, we must look at the question from the specific perspective of developing countries.

(c) The perspective of developing countries

First of all, it should be noted that a number of recent works have shown, using a variety of arguments, that there is no reason to think that intellectual property standards need to be the same in all countries (see Chang, 2001; Lall, 2001; Khan, 2002; Grossman and Lai, 2002). In other words, taking account of the peculiarities mentioned above regarding knowledge as an economic good, there is no guarantee that the same intellectual property regime will be the optimum in different economic, social, cultural or other scenarios.

It has therefore been argued that the strengthening of IPRs stimulates innovation in backward countries only once they have reached a certain level of development (World Bank, 2001; Chen and Puttitanun, 2002). Likewise, Riis (2002) highlights that the empirical evidence has still not corroborated the argument that the implementation of tighter intellectual property regimes will stimulate technology transfer towards developing countries.

In the case of databases specifically, the fear has been expressed in a number of studies that restrictive legislation will hinder the advancement of scientific research in developing countries (CIPR, 2002a). The arguments mentioned above concerning the disincentives to scientific cooperation that would result from the introduction of IPRs in databases apply especially to these countries. Indeed, the absence of incentives for cooperation and the mistrust between researchers caused by their fear over the commercial use of shared knowledge are aspects that hinder the relations that could be established between researchers in developing countries and those in more advanced countries, and would make it all the more important for there to be IPRs for scientific databases (Forero-Pineda and Jaramillo-Salazar, 2002). In turn, scientific activity in developing countries would also be affected by the increase in the costs of accessing information (even with the above-mentioned differential prices), in view of the often endemic budget problems that affect these countries. These fears increase when the introduction of new IPRs is combined with the use of computer technology to restrict access to information on the Internet (CIPR, 2002b).

On the other hand, if the aim is to promote database production in developing countries, it is clear that there needs to be in the first place a market for such databases, which requires, among other things, stimulating greater penetration of computers and Internet in these countries (given the large “digital gap” that currently exists at a global level); on this point, it must be borne in mind that ICT penetration in developing countries varies considerably, with countries being more or less developed in this field. If on the other hand it is argued that the relevant markets would be export markets, then clearly what is important is that there should be an adequate intellectual property regime in the target markets, *i.e.*, the developed countries. It could also be argued that the existence of adequate protection in developing countries would be a precondition for there to be a sufficient global supply of databases; however, in a situation where the markets in such countries are very limited, there is no reason to suppose that this argument is valid. Therefore, there could be a reason for developing countries to protect non-original databases if they meet the specific demands of these markets, but there is no evidence that this is happening at present. Finally, it would seem that the arguments suggesting that introducing IPRs in this area would stimulate technology transfer do not apply, since what is in

play here is information transfer, which is a very different thing from technology transfer (Riis, 2002).

On the basis of these arguments, we can agree with Riis (2002) that, at the very least, it can be stated that any benefits of *sui generis* protection for non-original databases are less in developing countries than in advanced nations.

Against this background, it is no surprise that a recent World Bank report (2001) states that developing countries only have to accord special legal protection to databases when they contain elements of creativity. It also stresses the need to analyze carefully whether it is necessary to introduce more protection for databases within the framework of the TRIPS Agreement, since that would affect access to information in developing countries and that adopting legislation similar to that in Europe would be counterproductive to the interests of these countries. As for the legislation already in place or that might be introduced in developed countries, it has been argued that there need to be exceptions based on the concept of fair use, as well as differential prices, for the scientific and educational communities in developing countries (Story, 2002; Riis, 2002).

Finally, it should be pointed out that although Braunstein (2002) has attempted to demonstrate the advantages of implementing international treaties on IPRs for databases–and has even presented arguments in favor of countries unilaterally establishing protection regimes–this position is based to a large extent on the application of theoretical tools developed originally for trade in goods. Unfortunately, these tools assume, among other restrictive assumptions, the absence of economies of scale, making their applicability to databases very limited, in the light of what we have said earlier.

III. THE PROTECTION OF NON-ORIGINAL DATABASES: THE CURRENT STATUS OF INTERNATIONAL LEGISLATION

As is evident from all the literature received on the subject, the debate on the intellectual property of non-original databases can be traced back to the case of “Feist” *vs.* Rural Telephone Service (1991), in which the Supreme Court of the USA found that compilations of data that did not meet the conditions of originality and/or creativity (that is, that were based merely on “industrious effort” or “sweat of the brow”) did not merit protection under the relevant copyright legislation.

The commotion caused by the Feist case must be seen against the background of the advent of ICT, which was causing explosive growth in the database market. On this point, although databases obviously existed long before it became possible to store and sell them electronically, it is fairly clear that the fallout from the Supreme Court of the USA ruling in the Feist case was much greater than it would have been 20 or 30 years earlier.

In 1996, two key events took place. Firstly, the EU adopted a specific Directive (96/9/EC) to protect databases, which established on the one hand protection under copyright legislation for databases that fulfil the criteria of originality in the selection and arrangement of the contents and, on the other, *sui generis* protection for those databases in which “substantial investment” has been made–whether qualitative or quantitative. The latter *sui generis* right applies whether or not the databases in question might also merit protection under copyright

legislation, *i.e.*, protections are cumulative.[34] Protection is granted for 15 years. There is also a procedure for renewing the term of protection for databases that undergo substantial addition or modification (it is important to note that the renewal of protection applies to the whole database and not only to the revisions). On the other hand, the manufacturer cannot rely on an exclusive right, but on the "possibility of prevention," which allows him to prevent the extraction or re-use of all or a large part of the contents of the database. The same occurs in the event of repeated or systematic extraction or re-use of small parts of the database that adversely affects the normal use of the database or prejudices the manufacturer's rights.

Secondly, towards the end of December of the same year, the WIPO Diplomatic Conference on questions of copyright and related rights did not consider a proposal relating to a possible treaty on intellectual property in databases, which had been driven by the USA and the EU, because a number of delegations felt the need for further study of the subject before taking any decision. At present, apart from the EU, some Nordic countries have legislation to protect non-original databases. In the USA, various bills have been put forward that failed to secure the necessary consensus for them to be approved, although the legislative body in that country is continuing to review the subject. As for Latin America and the Caribbean, only Mexico, by virtue of the Federal Law on Copyright (1997), has established protection for non-original databases, valid for five years.

Since it is the EU legislation that has had the greatest impact internationally, it is worth recapping briefly a number of studies that have analyzed its content and impact. Firstly, a number of authors have highlighted how broadly the term "databases" is defined. On this point, as we saw earlier, it is argued that, if taken literally, then museums could for example fall within the legislation. Although there will perhaps never be a legal case involving such an extreme example, it is fairly likely that problems could arise, for example, with regard to university courses (Lipton, 2002). Another illustration of similar concerns is to be found in the case of Internet sites that combine searches on certain topics, which could also be–and indeed have been in Europe–subject to claims based on the Directive in question. In this scenario, Maurer (1999) states that, sooner or later, all commercially valuable information will end up being granted protection as a database.[35]

The protection granted also seems too lax in regard to the requirements for obtaining it. The evidence of known court cases to date shows that expressions stating that protected databases must be "collections of independent data arranged in a systematic way and accessible individually," or that investment in them must be "substantial," do not in practice act as a real barrier to preventing just any compilation from qualifying for protection (Maurer *et al.*, 2001). The same lack of clarity arises with regard to other definitions of the law, for example, if someone extracts "insubstantial" data, but those data are of high value to the person extracting them, it could also be that this act is legally questionable (Hugenholtz, 2001).

Maurer *et al.* (2001), reviewing the specific experience of litigation in which the protection of Directive 96/9/EC has been invoked, find that half the cases involve companies

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34 See Cámara Lapuente (1999) for a summary of the differences and similarities between *sui generis* rights and copyright protection.

35 Some experts consulted for this study took the view that the introduction of the *sui generis* right gave rise to unnecessary debates on whether physical databases should be included. According to this view, the aim should be to protect the computerization of information, so that competitors cannot copy computerized files without effort or investment.

that create "synthetic data" (generated by the companies themselves), including telephone numbers, TV listings, dates of sporting events or concerts, etc. Clearly that is information that cannot be obtained independently by other agents. This is linked to the question of whether information that has to be produced in some form by a company as part of doing business–as is the case with telephone lists–also falls under the protection of the European legislation (a subject on which legal writers seem divided–see Hugenholtz, 2001).

Hughes (2002), also using court cases arising from the application of the Directive as a basis, points out that it has led courts to find for infringement of the *sui generis* right even in situations where there is only a single provider of the information in question. The same author also observes that the majority of cases brought before European courts under Directive 96/9/EC relate to pre-existing databases, for the creation of which that piece of legislation was apparently not required.

Another argument against is that the EU Directive grants greater protection than copyright legislation provides: (i) the Directive potentially grants protection in perpetuity, since any "substantial change," whether quantitative or qualitative, allows it to be renewed[36] (Cowan and Harison, 2001, point out that the average life of commercial databases is three years, a period in which most investment returns are recovered, for which reason the Directive constitutes an "over-protective" regime); (ii) "fair use" exceptions are more restrictive than in the case of copyright (it should be pointed out also that the Directive authorizes, but does not oblige, Member States to adopt such exceptions)[37, 38]–see Reichman and Samuelson (1997). On this point, it has been pointed out that the European Directive does not contain adequate safeguards to assure the scientific and educational communities of access to information at affordable prices. Another point criticized is the absence of mechanisms for compulsory licensing (Committee for a Study on Promoting Access to Scientific and Technical Data for the Public Interest *et al.*, 1999).

More extensive precautions need to be taken in the face of the impact of the Directive in cases where there is a single source. In fact, the resolution of some cases in European courts would seem to confirm the fears that the Directive gives infinitely extendible protection to the

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36 All dynamic databases would therefore qualify for renewal of protection in perpetuity.

37 The Directive empowers Member States to set limits on the protection in certain cases, for example, non-electronic databases reproduced for private use, or when the content of the databases is used for educational purposes, scientific research, public safety or in relation to an administrative or judicial proceeding, among others. However, it is expressly stated that this exception "may not be interpreted in such a way as to allow its application to be used in a manner which unreasonably prejudices the rightholder's legitimate interests or conflicts with normal exploitation of the database".

38 De Oliveira Ascensao (2002) puts forward an interesting example of conflict between the Directive in question and normal scientific practice. Take for example the case of a researcher carrying out a study on meteorology, for which he refers to existing databases on the subject, incorporating these data into his report. Once complete, the report is published as a book. If those databases had been protected by a *sui generis* right, the researcher would be violating the EU Directive, since although it authorizes taking extracts for scientific purposes, it does not do the same for re-use; it would be more serious if it were supposed that even the extraction of data would be illegal in this case, since the researcher was thinking of publishing a book (let it be said, by the way, that it would be hard to represent that book *per se* as direct competition to the databases that it is desired to protect). It is therefore easy to see the barriers and increases in costs that would be imposed on scientific activity if this type of right were to be made more widespread.

contents of dynamic databases, even in cases where the information is in the public domain but comes from a single source (Colston, 2001).[39]

However, even in cases where there is no single source, problems can arise. Thus, Millé (1996)–quoted in Herrera Bravo (2001)–points out that European legislation did not envisage the need to protect free access to information either for competitors who did not have access to the protected database or for third parties wishing to use the same information (extracted from any other source) for a purpose other than creating a new database. In that context, cases will arise "in which a manufacturer who has acquired a physical file tries to exercise complete control over it (an 'exclusive right,' not a 'possibility of prevention' measure) starting from the premise that possession of the supposed 'original' of the contents makes all reproduction a prohibited extraction."

It has also been suggested that although the EU *sui generis* right allows a potential competitor to use references from a protected database and to go directly to the original sources, this ignores the economic reality of database production, in which, as we saw earlier, there is not only a tendency to create "natural" monopolies, but also the eventuality of the reproduction of the contents becoming economically inefficient.

Questions are also raised over the strict limitations placed on the re-use of information contained in the Directive. According to Cámara Lapuente (1999), those limitations may even extend to legitimate users of the databases. This is the case with the ban on making copies–including backup copies–to prevent their use by unauthorized persons; it is also forbidden for a legitimate user to give unauthorized third parties access to the database by transferring the use of codes, decoding or decryption systems or other mechanisms–all of which in practice creates a situation in which re-use is banned.

Taking these arguments into account, the real danger is that a *de facto* monopoly is created on the factual contents of the protected compilations, with the consequent risk to the circulation and generation of knowledge (Baron, 2001). Along similar lines, it is pointed out that the European Directive removes the traditional distinction in copyright law between protection of expression and protection of ideas, with the consequent risk of impeding the free circulation of ideas.

The overall conclusion of the various investigations of European legislation on this topic is that the countries that are analyzing the introduction of laws or similar provisions should be cautious, so as to have more time to assess the actual consequences of Directive 96/9/EC, not only for the database industry but also for access to information, which is a key aspect of the impact on the social and economic development in the new global scenario (see Maurer *et al.*, 2001).

[39] "British Horseracing Board Limited v William Hill Organisation (2001)" is a case in point.

IV. THE SITUATION IN LATIN AMERICA AND THE CARIBBEAN

(a) The database market

The first thing to bear in mind is that there is no definite information on the size of the database market in any of the countries of Latin America and the Caribbean. It is outside the scope of this study to produce estimates of that type, a task that should be addressed in future studies. Here we will present the main features of the industry, its principal users and producers, with the aim of characterizing it in an essentially qualitative way. In any event, it can be stated with reasonable certainty that the size of the database industry in the region, measured in economic terms, is still very limited, especially in the relatively undeveloped countries.

It is therefore no surprise that the position of Latin America and the Caribbean as a database-producing region is clearly marginal on a world scale. Braunstein (2002), taking data from the *Gale Directory of Databases*, shows that in 2001, only 0.2% of all databases in existence worldwide came from "Southern America." Although there is reason to suppose that the number of databases in the region is clearly underestimated (since there are only 21 listed), there is nothing to suggest that the same is not true in other regions and countries. Whatever the case, this corroborates other evidence indicating clearly that the countries of Latin America and the Caribbean are much more "importers" of databases than "exporters." In fact, both the use and production of databases seem to be positively correlated to the level of economic and social development of the respective countries.

What types of database are produced in the region? Only in the case of Brazil have we been able to find systematic data on the subject, which relates to 1996. The following Table shows that there were some 700 databases in Brazil that year, both public and private, covering various subjects and areas.

Table: Databases in Brazil–1996

	Classification	Number of databases
A.	*Technical and scientific databases*	*89*
	Bibliographical	77
	Theses	12
B.	*Directories and guides*	*142*
	General	35
	Institutions	22
	Businesses	30
	Researchers	16
	Products and services	23
	Events	6
	Films and videos	6
	Other	4
C.	*Archives*	*272*
	General	234
	Pictures	004
	Legislation	19
	Cuttings/news stories	3
	Authorities/terminology	12
D.	*Information Technology Management and Business Databases*	*35*
	General	20
	Technical regulations	11
	Patents	4
E.	*Databases of Live Cultures*	*8*
F.	*Databases of Indicators/Statistics/Diagnoses*	*12*
G.	*Other Databases*	*136*
	General	10
	IBGE (Instituto Brasileiro de Geografia e Estatistica) [*Brazilian Institute of Geography and Statistics*]	78
	Cetesb (Companhia de Tecnologia de Saneamento Ambiental) [*Environmental Health Technology Company*]	48
TOTAL		*694*

Source: Freitas Pereira *et al.* (1999).

Therefore the evidence collected for this study shows that among the main database producers in the countries of the region there are various public bodies that generate or compile information of a commercial, economic, legal, financial or other nature, which in general they partly sell and partly distribute free of charge. In fact, it is likely that the public sector is the main producer of databases in several countries in the region. Similarly, there are various private providers who also market this type of information, often in direct competition with the public sector (replicating the situation in most developed countries), although generally adding value to the information covered by the public sector (facilitating access to and use of the information, sorting the respective data in different ways, etc.). Private supply of databases in Latin America and the Caribbean would seem to be concentrated mainly therefore on companies selling information on legal, commercial, credit and, to a lesser extent, financial topics. These databases are essentially of "local" interest, i.e., the vast majority of users of the information in question would be resident in the country or region to which the information relates.

The public sector also supplies information, as do universities and research institutes–either free of charge or for consideration, as the case may be–in fields where private domestic supply is less available or sometimes non-existent, such as meteorology, agriculture, hydrography, demography, health, cartography, geology, environment, etc., as well as in various fields of the "hard" sciences. In several of these areas, local users obviously also refer to localized databases in developed countries. On this point, it should be noted that while some of the relevant information in such areas relates to facts or data specific to the countries in the region (such as meteorology), local users may also be interested (more so in the case of legal or commercial databases, for example) in information contained in foreign databases (this is clearly the case with scientific activity, for instance).

Another important fact to take into account is that the degree of computerization of the databases in the region is clearly less than that found in developed countries, which is obviously the result of the lower level of ICT penetration in the region.[40] This creates a real obstacle to the development of the database market.

Tables A.1 to A.3 (in Annex I) show how backward many of the countries of the region are in terms of the deployment of the information and telecommunication infrastructure needed to gain entry to the world of the "new economy" (there are certainly significant differences between countries, with the nations of the Caribbean being relatively the most advanced, on average)[41]–as well as in the cost of access to this infrastructure. On this point it is interesting to look at the data shown in Table A.4 (see Annex I), relating to the Networked Readiness Index, originally presented in Kirkman *et al.* (2002).[42] According to the authors, the Index reflects the preparedness and the potential of a country to participate in a networked world. It remains clear that the bulk of the region is far from the level of preparedness needed to enter the "new economy," and thereby to be an important player in the production, export and consumption of computerized databases. Consequently, a precondition of the expansion of the database industry will be the rapid acceleration of ICT penetration in Latin America and the Caribbean (hand in hand with an increase in the levels of education of the population, so that this penetration is achieved without increasing the "digital gap" that still exists internally).

(b) The legal situation and existing database protection measures

In most of the region, the relevant national legislation on copyright has already explicitly embraced the concept that databases should have characteristics of originality in the selection and/or arrangement of their contents, in accordance with the provisions of the WIPO and WTO (TRIPS) treaties mentioned above. Decision 351 of the Cartagena Accord, agreed between Bolivia, Colombia, Ecuador, Peru and Venezuela, also includes provisions designed to protect these databases.

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40 Thus an Argentine subsidiary of a European-USA group of companies that includes among its main businesses the sale of legal information, reported that while in Argentina the percentage of invoicing using electronic means was around 8%, the figure was 50% in the USA; this is a direct result of the fact that the sale of data in digital format in the region is in its infancy.

41 The scarce population of some of these countries may partially explain the differences.

42 The index is compiled as a function of the various indicators that reflect the information and telecommunications infrastructure, the public policies applicable in these areas, etc.

In contrast, as mentioned earlier, only Mexico within the region has *ad hoc* legislation granting intellectual property protection for non-original databases. On this point, it should be noted that this legislation has been criticized by Mexican lawyers, who point out that it contradicts the Mexican Law on Copyright, in which this provision has been included (see Ovilla Bueno, 1998; Caballero Leal, 2000). These criticisms are based on the fact that in Mexico, as in almost all other countries in the region that have intellectual property legislation based on the Latin tradition, it is understood that copyright has always required creativity as a basis for protection, but there are no grounds for protecting goods on the basis of the investment needed to create them. For his part, Caballero Leal (2000) points out that Mexican law does not grant firm rights to producers of non-original databases, since it does not clearly define what their exclusive rights are, nor does it allow for the possibility of renewing the extension of the protection granted–which in the case of Mexico is five years–concluding that in practice it would not have a significant impact.

Therefore, as far as we have been able to ascertain, there is no draft legislation in any country in Latin America and the Caribbean that aims to incorporate special protection for non-original databases. On this point, it is interesting to note that, at least in some countries, the legislators seem aware of the debates that have taken place on the subject in other regions. Thus, when discussing current Argentine legislation that protects computer programs and original databases by means of copyright, one senator expressed his fear that the lack of adequate clarification on the subject could lead to protection being granted to telephone directories, for example (Quinn, 2000).

Without prejudice to the absence of specific provisions on the subject, most countries have various legal concepts that could be applied in the event of conflicts over the ownership of non-original databases; for example, laws or provisions relating to unfair competition, enrichment without cause, undue appropriation, etc., can clearly be applied in the event that a database owner is adversely affected by competitors who reproduce his or her products without due authorization.[43] In the case of Chile, therefore–according to the authorities of the Copyright Office consulted for this study–Law N° 19.223 on computer crime could be applied in some way to non-original databases in the absence of protection under copyright law. The same could perhaps apply in other countries in which similar legislation exists.

It can be argued that the effectiveness of these legal provisions is diminished in practice by problems of enforcement (a point highlighted by the majority of the institutions, businesses and experts consulted for this study). Although these problems are not exclusive to legislation on intellectual property, some observers argue that there is a cultural attitude within the region that is more "tolerant" of the copying of information than in more advanced countries, a fact that would make the situation much worse. Similarly, the relative "newness" of the subject where computerized databases are concerned would cause litigation to be even slower and more complex, through a lack both of established jurisprudence and of preparedness on the part of the legal profession.

As for the misuse of databases by legitimate users (which basically involves extending access to unauthorized persons or sharing relevant information with them), although there are

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[43] Certainly, suppliers of databases in the region have the option of registering the elements of their databases that may be protected both by copyright legislation (for example, thesauruses, methods of interrogation, look-up and visualization, indexes, computer programs used in the operation of databases, etc.), as well as by other legal means (trademarks, logos, etc.).

generally contracts or licenses that prohibit such actions, in practice it appears that going down the legal route to prevent them is very costly.[44]

In this situation, database suppliers mainly use technical methods (encryption, access codes, etc.) to protect their products. At least for the majority of those consulted, these provide relatively good–although certainly not complete–protection (the difficulties would appear to center on the problem of users who for example give their access codes to unauthorized persons).

Certainly it must be said that, apart from the high cost, the result of using technological protection measures tends to be that looking up information or data is made less convenient and user-friendly, specifically as a means of making the protection given by the technology viable. On this point, companies must balance the desire to minimize potential losses by the unauthorized use of their data with the need to maintain sufficient flexibility, so as not to harm legitimate users, especially when there are a number of alternative suppliers in the market.[45]

Trademarks are also a means of protection, as are strategies of constantly refreshing information, adding value, etc. Also, businesses that own databases constantly monitor their competitors, with the aim of detecting possible unfair behavior. Therefore, there are databases that are only available online and protected by the fact that they are so large as to make the copying of elements too costly and slow, unless they can be extracted directly from the servers where they are stored, for it to be economically profitable to expend the effort involved. This is therefore a situation in which the contents of most databases of a commercial nature are generally updated frequently and in which the owners rarely authorize "block look-ups," so that the information has to be accessed one piece at a time.

Another way of preserving markets by attending to the different needs of users is that employed by a number of businesses–for example, those selling financial information–which is to set different prices for the information dependent on how up to date their clients require it to be, which tends to reduce the incentive to make unauthorized copies of the information.[46]

Although almost all the firms and institutions that we consulted reported having suffered economic damage through unauthorized appropriation of information by competitors and/or users, the losses caused by these actions would seem to be in the vast majority of cases too small to justify taking legal action.[47, 48] We have not found any evidence that they have stopped investing in certain databases because of a lack of appropriate legal protection. In any

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44 Businesses would try to resolve these problems when they uncover them by means of persuasion and informal negotiations with users.

45 In fact, companies would be in a position to detect for example the practice of sharing access codes, but at least for the time being, would consider that any benefit from being stricter with the use of the codes would not compensate for the costs incurred in achieving this objective (not to mention the fact that it would probably result in restrictions that would affect the ease of access to databases even for authorized users).

46 This is the strategy given the name of "*versioning information*" by Shapiro and Varian (1999).

47 One business involved in commercializing databases containing commercial information, with operations in Argentina, Chile and Uruguay, put its losses through unauthorized use of its databases at some 5-10% of its invoicing.

48 Situations have been reported to us in which, although the owners of the databases are sure that their information is being used by persons who do not have legally-acquired rights, they have difficulty in identifying the culprits.

case, these conclusions must be tempered by the fact that in a number of cases, firms producing databases have only relatively recently begun offering their products in digital format, which could explain that the incidence of problems with copying information and contents (or the awareness of the incidence of such problems) is less than in more advanced countries.[49] The evidence that we have been able to collect for this study therefore indicates that the only cases in which legal action has been taken over the copying of information contained in computerized non-original databases have been in Argentina[50] and Ecuador.[51] There have also been cases within the Ecuadorian administration in which applications have been made to take preventive measures against the presumed illegal use of electronic databases. However, there have of course been many other episodes of piracy that have not reached the courts, but have been resolved privately (as well as others that are still happening without it being easy, as we said before, to identify accurately the guilty parties). On the other hand, it should be pointed out that there have been cases in which the courts have already protected compilations that complied with the requirements of originality in the arrangement and/or selection of data in a form that can be protected under copyright legislation.[52]

The general conclusion of our field work in this area is that, with one exception,[53] there is no evidence to suggest that businesses and institutions that maintain and market databases in Latin America and the Caribbean have a case for *sui generis* legislation similar to that introduced in the EU. In fact, in the interviews and contacts that we carried out in the course of our research, we found that the majority of organizations involved in the marketing of databases had little knowledge of the debate on the subject in Europe and the United States, and that several did not even know that if European-style legislation were applied, their databases could receive specific legal protection.[54] In turn, the respective copyright offices in the region

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49 In turn, the problems of piracy of information in Latin America certainly existed before computerization.

50 Two cases were referred to us concerning Argentina. The first involved a business providing accounting and tax information: one of the digital bulletins that it offered to its clients was copied and distributed by another firm. Although there were grounds for the company in breach to be found guilty of unfair competition, the court did not apparently uphold the complaint of the affected company. The second, still unresolved within the criminal justice system, arose from an accusation made by the company Nosis against the firm Axesor (one of whose shareholders is a risk fund of the Banco Santander Central Hispano, based in Spain) in relation to the copying of a CD containing information on credit risk, marketed by Nosis.

51 The dispute arose between two companies that market compilations of laws in digital format.

52 In Argentina as early as 1974 there was such a case, resolved in favour of the applicant, relating to copying of a database that contained regulations on external trade (CNCiv Sala D 30/4/74 re "Guía Práctica del Exportador e Importador SRL [Practical Guide for Limited Liability Export and Import Companies] *vs*. Empresa IARA and others")–see Quinn (2000). More recently, the company La Ley [The Law] obtained a favourable ruling in 1996 in a case against another firm that had reproduced without permission a reference database on legal indexes that La Ley was marketing on CD.

53 Only in the case of the *Serviço Federal de Processamento de Dados* (SERPRO) [Brazilian Federal Data Processing Service] did the authorities consulted express a clear opinion, based on definite knowledge of the case, in favour of implementing *sui generis* protection for databases (significantly, this is a state-owned company).

54 At the same time, there are cases in which certain businesses arrogate to themselves, although certainly without sound legal grounds, rights that they do not possess. Thus, a Chilean portal providing economic and business information advises on its web page that "any text, music, sound, photographs, videos, graphics, programs and generally any information contained in this portal, in any medium, will be counted as "Content." This Content is the exclusive property of

[Footnote continued on next page]

have not reported that the private players who could receive protection in the case of *sui generis* legislation being approved are pushing for a change of this sort (which could be a result of, among other things, the small size of the industry, as mentioned earlier). All this certainly does not imply that companies in the sector do not want a better level of legal protection than that they currently have; however, the general conclusion is that, at least for the moment, the greater concern where the law is concerned would be to improve the level of enforcement of existing legislation.

V. CONCLUSIONS

The discussion around IPRs for non-original databases probably illustrates in a particularly acute way the ever-present tension between the need to establish an attractive framework of incentives for the generation of new products and ideas and the objective of ensuring that these products and ideas generate the greatest possible "spin-offs" for the whole of the economic system and the social fabric.

We feel that in this case the tension is especially acute in that a *sui generis* regime for databases would not aim to protect the databases themselves as new and/or creative products, but the information contained in them, with the consequent risk that restrictions will be placed on the circulation of the information, including that which up to now has been in the public domain. In other words, the creation of new IPRs in databases could skew the balance between protection and dissemination in a dangerously pronounced way in favor of protection. The threats in this area are found not only in the very sensitive areas of science and education, but also in actual trade, particularly in connection with the development of the Internet, for example.

Another key point is that this regime would not focus on promoting the generation of ideas or new goods, nor on creative forces, but basically on the investments made in the collation and organization of information of various kinds (as well as other types of element, at least in the European Union definition). In principle, that would go against the tradition not only of copyright legislation in a large part of the world but also the objectives that should inspire IPR regimes from an economic point of view. Also, at least in the form in which the *sui generis* regime has been established in the EU, it would have the potential risk of generating protection in perpetuity (which would be contrary to the idea of temporary protection which underpins intellectual property legislation).

It is therefore no surprise to find that even in developed countries–the main producers and consumers of databases–there is a vigorous discussion going on about the usefulness of adopting *sui generis* legislation of the type implemented in the EU, a discussion which for the moment has blocked the introduction of similar regulations in the United States.

Far more doubts arise in the case of developing countries, since, given that they are at present mainly consumers rather than producers of databases, the adoption of international disciplines would appear to generate an even less favorable cost-benefit balance than in the advanced nations.

[Footnote continued from previous page]

the company, and is protected by local laws and international treaties on intellectual property" (see Jijena Leiva, 1999).

The empirical evidence that we have collected for Latin America and the Caribbean, in its turn, does not seem to support the argument in favor of introducing IPRs for non-original databases, in that we have not observed that the incipient industry that exists in the region, apparently concentrated in the more advanced countries, is being damaged by the absence of *sui generis* legislation; the commercial damage that certainly does exist, although its extent is not clear, seems to derive more from the lack of adequate enforcement of existing current legislation. Consequently, there does not appear to be a definite economic or social interest at present, from the point of view of the countries of the region, in international legislation on non-original databases such as that proposed years ago within WIPO.

All this, however, must not be interpreted as meaning that the current situation is in any way ideal. It is clear, on the one hand, that in spite of the existence of both legislation and technological means that could protect investments in the creation and maintenance of databases, there are problems not only of enforcement of relevant contracts and laws, but also of technological protection measures being circumvented, with the consequent monetary losses for database owners (owners that not only operate in the private sector but are in many cases State bodies).

In turn, from a dynamic point of view, it could be expected that the database industry in Latin America and the Caribbean will grow over time–especially as ICT penetration in the region increases–as a result of which disputes of greater significance than those found up to now could arise in the future.

Consequently, continued study of the subject is required. In particular, it would be important in the future for firm economic information to be produced on the size of the industry in the region. Although this is a complex task, as demonstrated by the very scant information existing on the subject even in developed countries, it is clear that this is essential in order to provide a firmer empirical basis for the debates on the subject.

Therefore, our study points to two steps that could potentially benefit the development of the database industry in the countries of Latin America and the Caribbean: (i) improved enforcement of regulations currently in place, both in the area of copyright and in other relevant legal fields (such as unfair competition); (ii) a move towards greater ICT penetration in the countries of the region.

In the future, a process of dialogue should be started between the various interested parties in order to assess to what extent it might be necessary to reform current legislation on unfair competition, for example, in order to increase the effectiveness of protection for database owners in the region. That same dialogue could bring about new agreement on whether or not there is a need to put forward some form of database protection by means of IPRs–and on how such protection would work, in the event of a decision to the effect that its implementation would be beneficial–including in a multilateral framework, on the basis both of the accumulation of experience in the application of regulations that already exist in some regions and of the actual evolution of the database market in the countries of Latin America and the Caribbean.

[Follows Annex I]

ANNEX I

Table A.1: Access to Telephony in Latin America and the Caribbean–2001

Cellular telephony		Fixed-line telephony	
Country	*Nº of subscribers per 100 inhab.*	Country	Nº of telephone lines per 100 inhab.
Martinique	71.53	Bermuda	87.15
Guadeloupe	63.59	St. Kitts and Nevis	56.88
Aruba	50.00	Virgin Islands (USA)	56.37
Chile	34.02	Antigua & Barbuda	47.35
Antigua & Barbuda	31.77	Barbados	46.29
Puerto Rico	30.65	Guadeloupe	44.93
Virgin Islands (USA)	28.90	Martinique	43.00
Jamaica	26.94	Bahamas	40.03
Venezuela	26.35	Aruba	35.03
Mexico	21.68	Puerto Rico	33.64
Panama	20.70	Grenada	32.75
Bermuda	20.64	Dominica	29.06
Paraguay	20.40	Uruguay	28.29
Bahamas	19.66	Trinidad & Tobago	23.99
Surinam	19.11	Chile	23.90
Argentina	18.61	Costa Rica	22.97
Trinidad & Tobago	17.34	St. Vincent	21.96
Brazil	16.73	Brazil	21.78
Uruguay	15.47	Argentina	21.63
Dominican Republic	14.65	Jamaica	19.73
El Salvador	12.50	Surinam	17.58
Belize	11.55	Colombia	17.05
Barbados	10.64	Panama	14.83
Guatemala	9.70	Belize	14.44
Bolivia	8.99	Mexico	13.72
Guyana	8.66	Venezuela	11.20
Colombia	7.63	Dominican Republic	11.02
Costa Rica	7.57	Ecuador	10.37
Ecuador	6.67	El Salvador	9.34
Grenada	6.41	Guyana	9.19
Peru	5.92	Peru	7.75
Honduras	3.61	Guatemala	6.47
St. Kitts and Nevis	3.12	Bolivia	6.22
Nicaragua	2.99	Paraguay	5.12
St. Vincent	2.08	Cuba	5.10
Dominica	1.56	Honduras	4.71
Haiti	1.11	Nicaragua	3.12
Cuba	0.07	Haiti	0.97
USA	*44.42*	*USA*	*66.45*
Oceania	*44.95*	*Europe*	*40.62*
Europe	*43.77*	*Oceania*	*40.02*
Latin America & Caribbean	*17.17*	*Latin America & Caribbean*	*23.27*
World	*15.57*	*World*	*17.21*

Source: International Telecommunications Union (ITU).

Table A.2: Internet Access and Penetration of PCs in Latin America and the Caribbean–2000

PCs		*Internet*			
Country	Nº PCs per 100 inhabitants	Country	Nº of Servers per 10,000 inhabitants	Country	*Nº of Users per 10,000 inhabitants*
Bermuda	46.54	Bermuda	527.27	Bermuda	3901.37
Guadeloupe	19.74	Uruguay	162.02	Chile	1657.65
St. Kitts and Nevis	18.17	Argentina	72.98	Aruba	1365.36
Costa Rica	14.91	Mexico	56.55	Uruguay	1108.78
Grenada	12.71	Panama	53.13	Puerto Rico	1021.79
Martinique	12.66	Brazil	51.53	Virgin Islands (USA)	1003.22
Belize	12.49	Trinidad & Tobago	50.96	Peru	974.20
St. Vincent	10.58	Chile	48.81	Dominica	777.77
Uruguay	10.49	Antigua & Barbuda	40.95	Trinidad & Tobago	772.58
Chile	8.23	Aruba	28.09	Argentina	675.09
Barbados	8.22	Virgin Islands (USA)	28.07	Antigua & Barbuda	652.03
Dominica	7.13	Dominica	24.24	Belize	624.47
Trinidad & Tobago	6.18	Costa Rica	18.29	Guyana	603.95
Mexico	5.76	Guadeloupe	12.46	Costa Rica	566.74
Argentina	5.13	Belize	12.20	St. Kitts and Nevis	516.10
Brazil	5.00	Colombia	11.06	Grenada	435.56
Jamaica	4.66	Dominican Republic	9.24	Bahamas	431.58
Venezuela	4.55	Martinique	8.91	Venezuela	393.05
Peru	4.09	Venezuela	6.68	Barbados	373.83
Panama	3.70	Jamaica	5.71	Panama	317.01
Colombia	3.54	Guatemala	4.92	Jamaica	310.55
Guyana	2.56	Peru	4.17	St. Vincent	308.57
Ecuador	2.17	Puerto Rico	3.86	Brazil	293.92
El Salvador	1.91	Barbados	3.74	Mexico	274.31
Bolivia	1.68	Nicaragua	2.76	Surinam	269.79
Paraguay	1.27	Paraguay	2.36	Colombia	207.46
Guatemala	1.14	Bolivia	1.59	Dominican Republic	185.88
Honduras	1.08	St. Kitts and Nevis	1.04	Guadeloupe	175.44
Cuba	1.07	El Salvador	0.92	Bolivia	144.07
Nicaragua	0.89	Bahamas	0.79	Ecuador	142.34
Antigua & Barbuda	–	Guyana	0.69	Martinique	127.46
Aruba	–	Cuba	0.59	Nicaragua	98.54
Bahamas	–	Grenada	0.32	El Salvador	79.67
Dominican Republic	–	Surinam	0.23	Paraguay	72.78
Haiti	–	Honduras	0.20	Guatemala	70.27
Puerto Rico	–	Ecuador	0.18	Honduras	61.68
Surinam	–	St. Vincent	0.18	Cuba	53.58
Virgin Islands (USA)	–	Haiti	–	Haiti	24.54
USA	*58.52*	*USA*	*2928.32*	*USA*	*4506.96*
Oceania	*36.52*	*Oceania*	*647.61*	*Oceania*	*2511.12*
Europe	*16.74*	*Europe*	*157.27*	*Europe*	*1359.48*
Latin America & Caribbean	*6.59*	*Latin America & Caribbean*	*96.28*	*Latin America & Caribbean*	*570.49*
World	*7.72*	*World*	*177.93*	*World*	*641.37*

Source: International Telecommunications Union (ITU).

Table A.3: Cost of Internet Access–2001

Annual average cost for 20 hours' Internet access per month as a percentage of *per capita* GDP (measured in PPP)

Ranking*	Country	Cost
1	Sweden	0.12
2	Belgium	0.29
3	Finland	0.37
4	Norway	0.37
5	Iceland	0.46
6	Japan	0.49
7	Switzerland	0.57
8	United States	0.65
9	Taiwan	0.68
10	Denmark	0.71
29	Uruguay	2.63
31	Argentina	3.20
32	Trinidad & Tobago	3.30
36	Chile	4.54
41	Mexico	5.17
42	Brazil	5.26
44	Costa Rica	5.43
45	Venezuela	6.04
47	Colombia	8.08
48	Jamaica	8.40
49	Panama	8.44
53	Bolivia	9.83
58	El Salvador	11.52
61	Guatemala	15.57
62	Dominican Republic	15.62
65	Paraguay	20.39
66	Ecuador	25.03
67	Honduras	32.07

Source: Kirkman (2002).

* Of 75 countries ranked.

Table A.4: Networked Readiness Index (NRI)–2001

NRI Ranking**	Country	Networked Readiness
1	United States	6.05
2	Iceland	6.03
3	Finland	5.91
4	Sweden	5.76
5	Norway	5.68
6	Netherlands	5.68
7	Denmark	5.56
8	Singapore	5.47
9	Austria	5.32
10	United Kingdom	5.31
32	Argentina	4.01
34	Chile	4.00
37	Uruguay	3.80
38	Brazil	3.79
44	Mexico	3.58
45	Costa Rica	3.57
46	Trinidad & Tobago	3.52
47	Dominican Republic	3.52
48	Panama	3.42
50	Venezuela	3.41
52	Peru	3.38
55	El Salvador	3.30
56	Jamaica	3.29
57	Colombia	3.29
63	Paraguay	3.15
67	Bolivia	3.04
68	Guatemala	3.00
69	Nicaragua	2.83
71	Ecuador	2.65
72	Honduras	2.64

Source: Kirkman *et al.* (2002).

[Follows Annex II]

** Of 75 countries ranked.

ANNEX II

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