Chapter 5

COPYRIGHT, SOFTWARE AND THE INTERNET

INTRODUCTION

Any serious enquiry into the subject of IP and development has to consider the crucially important role of copyright and the copyright-based industries (including publishing, film, television, radio, music and now computer software too) in the production and dissemination of knowledge and knowledge-based products. These industries supply the intellectual "raw material" for science and innovation, as well as for education and instruction in general, and they have helped bring about dramatic increases in productivity through aiding the creation of information-based products like desk-top publishing software, electronic mail or sophisticated scientific computer databases. Moreover, the copyright-based industries have developed into a huge source of wealth and employment creation in the knowledge-based global economy. In the US, for example, their overall combined value has increased at such a rapid rate in the last twenty or thirty years, that together they currently contribute more than $460 billion to US gross domestic product and sold almost $80 billion in exports in 1999.[1]

For developing countries this provides both enormous opportunities and challenges:

> "The creation and ownership of knowledge products are of increasing importance because of the centrality of information and knowledge to post-industrial economies. The concept of copyright, originally intended to protect authors and publishers of books, has broadened to include other knowledge products such as computer programs and films… Copyright has emerged as one of the most important means of regulating the international flow of ideas and knowledge-based products, and will be a central instrument for the knowledge industries of the twenty-first century. Those who control copyright have a significant advantage in the emerging, knowledge-based global economy. The fact is that copyright ownership is largely in the hands of the major industrialized nations and of the major multimedia corporations placing low per capita income countries as well as smaller economies at a significant disadvantage."[2]

The legal protection of copyright dates back to the 1700s with the Statute of Anne, and at the end of the 19th century it was enshrined in the Berne Convention. Although the language of the Convention suggests a paradigm for the protection of the rights of authors and artists, in many cases copyright belongs not to individuals but to the firms that employ them. Indeed, copyright is an essential element in the business model of publishers, television and record companies, and software producers because they grant their owners exclusive rights, *inter alia*, over the reproduction and distribution of protected works. The new information and communication technologies (ICTs), and in particular the Internet enable unauthorised creation of unlimited, perfect and costless copies of protected works, as well as their almost instantaneous and worldwide distribution. This poses an unprecedented challenge to copyright law. Some believe the future will see copyright become of far less importance as industries switch to technology-based protection, in the form of encryption and anti-circumvention measures, supplemented by contract law and *sui generis* forms of IP protection for databases.

We believe that copyright-related issues have become increasingly relevant and important for developing countries as they enter the information age and struggle to participate in the knowledge-based global economy. Of course, some developing countries have long standing concerns that copyright protection for books and learning materials, for example, may make it harder for them to achieve their goals in education and research. These were prominently expressed at the 1967 Stockholm Conference of the Berne Convention and remain valid today.

Copyright deserves special attention now not only because millions of poor people still lack access to books and other copyrighted works, but because the last decade has seen rapid advances in information and communication technologies, transforming the production, dissemination and storage of information. This has been accompanied by a strengthening of national and international copyright protection. Indeed, it was largely these technological changes that led the copyright-based industries in the developed countries to lobby for TRIPS and the WIPO Copyright Treaty, as well as the *sui generis* protection system for databases established by the EU in 1996. These trends are likely to have both positive and negative aspects for developing nations and it is important to understand how they impact on such countries, particularly the poor.

The crucial issue for developing countries is getting the right balance between protecting copyright and ensuring adequate access to knowledge and knowledge-based products. It is the cost of access, and the interpretation of "fair use" or "fair dealing" exemptions that are particularly critical for developing countries, made more so by the extension of copyright to software and to digital material. These issues need to be addressed to ensure developing countries have access to important knowledge-based products as they seek to bring education to all, facilitate research, improve competitiveness, protect their cultural expressions and reduce poverty.

In this chapter we consider the following issues:

- How important is copyright as a stimulus to cultural and other industries in developing countries?
- How does copyright affect developing countries as consumers of products from abroad, particularly educational material, including via the Internet?
- What should developing countries do about enforcement of copyright?
- How does copyright on software affect developing countries?

COPYRIGHT AS A STIMULUS TO CREATION

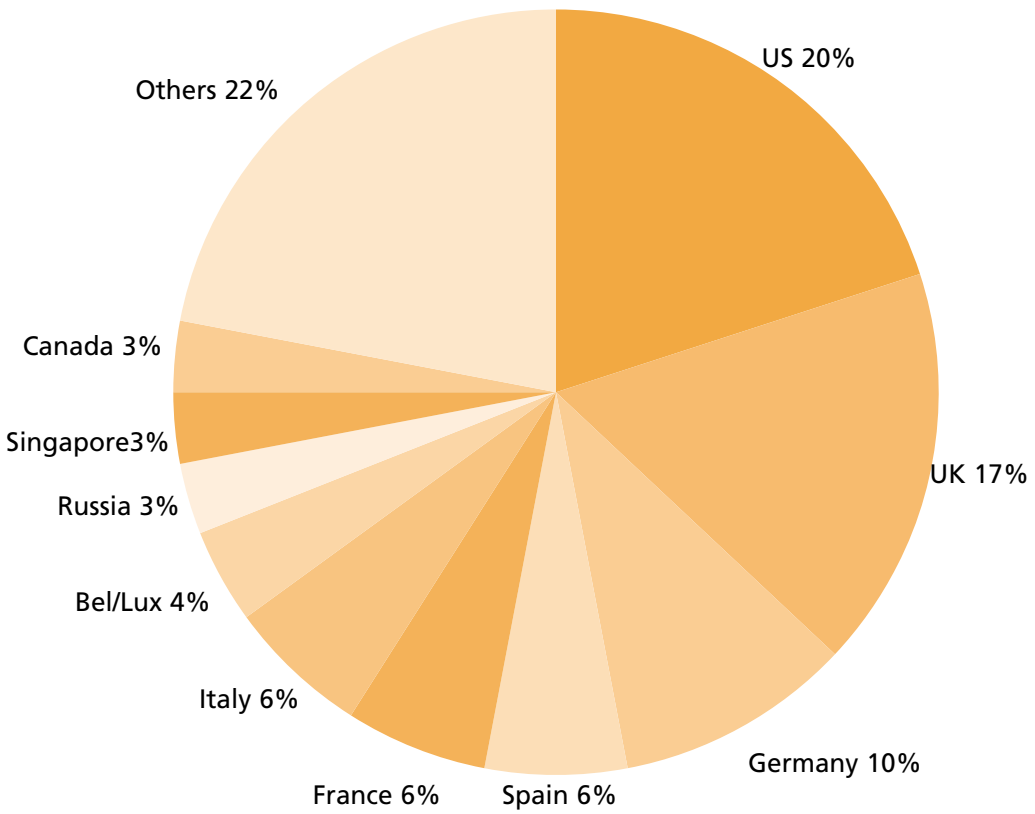
As agencies such as WIPO, UNESCO and the World Bank have pointed out, it is important that developing countries develop mechanisms to protect and benefit from the commercial exploitation of their own past and present creative works. On this view, copyright can play an important role in the development of cultural industries in developing countries by ensuring rewards through

exclusive rights over copying and distribution.[3] In Chapter 4, we discuss the issues relating to protection of traditional knowledge in developing countries and much of that is also relevant here, in so far as such knowledge and creativity may be protectable under copyright.

From a global perspective, the direct rewards from copyright protection are largely directed to the publishing, entertainment and software industries in Europe and North America. As Figure 5.1 below shows, the US, UK, Germany, Spain, France and Italy between them produced nearly two thirds of global exports of books in 1998. But, in some instances, copyright-based industries in developing countries are also flourishing and obtaining a share of these rewards.

Perhaps the most famous case is the Indian software industry. Between 1994-95 and 2001-02, the industry's gross earnings expanded from $787 million to $10.2 billion (a large proportion of which were software exports, which grew in value during the period from $489 million to $7.8 billion) and by March 2002, the software and services sector employed about 520,000 workers.[4] And certainly there is a wealth of creative talent in developing countries – such as the musicians in Mali and Jamaica or the traditional artists in Nepal – which could be harnessed to generate more wealth for emerging economies. But this will only happen if there is a local infrastructure for cultural industries, for example for publishing and recording. Currently many writers and musicians in developing countries (particularly in Africa) have to rely on foreign publishers or record companies.

Figure 5.1 The Top Book Exporting Countries by Market Share, 1998



Source: UNESCO (2000a)

At the same time, whilst there are success stories like India's software industry, there are also developing countries who have provided copyright protection as members of the Berne Convention for decades (such as Benin or Chad which joined in 1971) and have not seen significant increases in their national copyright-based industries or in the level of copyright-protected works being created by their people.

The evidence suggests, therefore, that the availability of copyright protection may be a necessary but not a sufficient condition for the development of viable domestic industries in the publishing, entertainment and software sectors in developing countries. Many other factors are important for the sustained development of such copyright-based industries. Taking the publishing industry in Africa as an example, factors such as the unpredictability of textbook purchasing by governments and donors, weak management skills in local firms, high costs for printing equipment and paper, and poor access to finance are likely to continue to act as very severe constraints in many countries for the foreseeable future.[5]

Moreover, given the small market size of many developing countries, the availability of copyright protection may be most significant from a commercial standpoint in export markets rather than domestically, notwithstanding the fact that authors and companies from developing countries may face insurmountable costs when action to enforce their rights in such markets is required. Of course, in larger developing countries like India, China, Brazil or Egypt, copyright protection in the domestic market is clearly of considerable importance to national publishing, film, and music and software industries. Although, as we have noted, during the 19th century the US sought to aid the development of its domestic publishing industry by not recognising the rights of foreign copyright holders.

Collecting Societies

In order to realize the potential benefits of copyright, some developing countries have established collective management societies, which represent the rights of artists, authors and performers and collect royalties from licensing copyrighted works held in their inventories. At present, only a minority of developing countries has followed this approach and there are quite different views on the merits of the establishment of collective management societies. WIPO and some donor agencies actively advocate and support them, as do some developing country governments (for example, in the Caribbean). Copyright-based industry groups in developed countries also argue that the establishment of Reprographic Rights Organisations in developing countries would facilitate wider provision of access to protected works through photocopying at rates suited to the local market.

On the other hand, some commentators argue that although such organisations in developing countries may collect royalties for local authors and artists, they are likely to collect far more for foreign rights holders from developed countries who may often dominate the market place for copyrighted works. For example, in South Africa, where the balance is likely to be more favourable than in lower income developing countries, its Dramatic, Artistic and Literary Rights Organisation (DALRO) distributed a total of approximately €74,000 to national rights holders, of which approximately €20,000 were received from foreign collecting societies; whilst over the same period it distributed approximately €137,000 to foreign rights holders.[6] It is also important to recognise that collective management organisations can potentially wield significant market power and may act in an anti-competitive manner. This is particularly of concern in developing countries with weak institutional capacities and regulatory frameworks.

Ultimately, developing countries will have to make their own judgements on the benefits of establishing collective management organisations. In developing countries with large markets for the products of their copyright-based industries, domestically and abroad, establishing these institutions may bring financial benefits for copyright holders. In other countries, the net benefits to the citizens of the country as opposed to foreign nationals means it may be difficult to justify the costs. In any event, it would seem to be imperative that the full costs of establishment and operation of such agencies in developing countries are demonstrated transparently from the outset

and that these are borne by copyright holders as the direct beneficiaries. Moreover, collective management organisations should probably not be created unless properly functioning specialist copyright and competition tribunals can be established in parallel.

Although the potential benefits from the development of copyright-based industries in some developing countries may be enticing in some cases, it is hard not to conclude from looking at the evidence from the developing world overall that the negative impacts of stronger copyright protection are likely to be more immediate and significant for the majority of the world's poor. Today, there is an enormous "knowledge gap" between the richest and the poorest countries. As the World Bank has noted:

> "If knowledge gaps widen, the world will be split further, not just by disparities in capital and other resources, but by the disparity in knowledge. Increasingly, capital and other resources will flow to those countries with the stronger knowledge bases, reinforcing inequality. There is also the danger of widening knowledge gaps within countries, especially developing ones, where a fortunate few surf the World Wide Web while others remain illiterate. But threat and opportunity are opposite sides of the same coin. If we can narrow knowledge gaps and address information problems … it may be possible to improve incomes and living standards at a much faster pace than previously imagined."[7]

In the long term, stronger copyright protection may help to stimulate local cultural industries in developing countries if other conditions affecting the success of such industries are also met. But in the short to medium term, it is likely to reduce the ability of developing countries and poor people to close this gap by getting the textbooks, scientific information and computer software they need at affordable cost.

WILL COPYRIGHT RULES ALLOW DEVELOPING COUNTRIES TO CLOSE THE KNOWLEDGE GAP?

In theory, international copyright rules should be able to deal with problems of access because they provide room for countries to include exemptions and relaxations of copyright in certain circumstances under their national laws. So, for example, Articles 9 and 10 of the Berne Convention permit countries to allow limited copying of protected works without permission for certain purposes defined in national legislation such as teaching, research and private use, so long as these do not interfere with the normal exploitation of the work by the copyright owner (see Box 5.1).

At the 1967 Stockholm conference of the Berne Convention, developing countries argued for additional flexibilities within international copyright rules because of their needs for mass education. The conference produced a Protocol that allowed developing countries to provide a reduced term of protection of 25 years together with compulsory licensing for translations into local languages and, most controversially, for any protected use for educational, scientific or research purposes. But the Stockholm Protocol was never ratified because of a lack of consensus between developed and developing countries. Eventually, in Paris in 1971, agreement was reached on a watered down set of exemptions for developing countries, essentially allowing limited compulsory licensing of works for translation into local languages. These are set out in an Appendix to the Convention, but it has been of very little direct benefit to developing countries, as shown by the fact that only a handful of developing countries have ever included the special provisions in their national law.[8]

A central question is whether the exemptions and limitations within the existing framework of international rules allow developing countries to set the right balance in protecting copyright whilst addressing their special development needs. There are certainly grounds for doubt. As one distinguished international copyright expert has put it:

> "Where a developing country decides to enter international copyright relations it will generally find that a perceptible gap remains between what is needed to satisfy its requirements [for education and transfer of knowledge] and the standard of protection demanded by a multilateral instrument such as the Berne Convention."[9]

In fact, our consultations with stakeholders and reading of the evidence suggests that the issues are most serious in relation to access to education materials where demand is not met by the local publishing industries or donor-financed programmes; and in relation to access to computer software, a pre-requisite for access to information and for competitiveness in the global economy. The arrival of the digital era provides great opportunities for developing countries in accessing information and knowledge. The development of digital libraries and archives, Internet-based distance learning programmes, and the ability of scientists and researchers to access sophisticated on-line computer databases of technical information in real time are just some examples. But the arrival of the digital era also poses some new and serious threats for access and dissemination of knowledge. In particular, there is a real risk that the potential of the Internet in the developing world will be lost as rights owners use technology to prevent public access through pay-to-view systems.

Box 5.1 "Fair Use" and "Fair Dealing" in the Digital Era

As part of the balance between the exclusive rights of authors, artists and other creators on the one hand, and the social goal of wide dissemination of knowledge on the other, international copyright rules allow countries to place limits on the right to prevent unauthorised use and reproduction in certain prescribed circumstances. For example, article 9, paragraph 2 of the Berne Convention states *"It shall be a matter for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interests of the author."*

Accordingly, national copyright laws in most countries incorporate exceptions for copying for personal use, research, education, archival copying, library use and news reporting, based on principles of 'fair dealing', or in the US, the doctrine of 'fair use'. The scope, strength and flexibility of these exceptions vary widely between countries and regions, in part due to differing national jurisprudence, but generally focus on the following conditions:

- The purpose and character of the use – copying must be for private, non-commercial purposes. Only single or a small number of copies may be reproduced.
- The proportion of the work that is copied – copies should be made only of parts of the work. Complete works may be copied only where originals are not available on the market.
- Copies of hard copy works may typically be produced only by reprographic processes. There is also some freedom to make copies of electronic works as, for example, for time-shifting of TV programs or archiving of computer software.
- If there are exemptions for the benefit of libraries and archives, those institutions must be accessible to the public and act in a non-commercial way.
- The legitimate interest of the right-holder must be taken into account – the effect on the potential market for the work.

The development and diffusion of digital technology, however, now permits unauthorised creation of unlimited, perfect and costless copies, and the almost instantaneous and worldwide distribution of protected works. The copyright industries are responding by using digital technology, in the form of encryption technologies and anti-circumvention measures, supplemented by contract law and *sui generis* forms of databases protection. Critics argue that these measures effectively restrict "fair use", and may reduce the ability of teachers, students, researchers and consumers to access information, particularly in developing countries. On this view, new approaches are needed to ensure that appropriate "fair use" exceptions can be preserved in this digital context.[10]

COPYRIGHT-BASED INDUSTRIES AND COPYING OF PROTECTED WORKS

As we note at the beginning of this chapter, copyright-based industries such as publishing and computer software play a major part in the global knowledge-based economy, and the products and services they provide have a central role in facilitating innovation and social and economic development in general. The success of these industries is reflected by their tremendous growth, which has generated millions of high-paying jobs and billions in revenues, including in some developing countries. The computer software industry is also a highly important source of innovation in its own right and its members argue that they have produced dramatic gains in the performance and functionality of many commercial software products in the last decade or so while prices have remained stable or even fallen.

Representatives from these industries have stressed to us the importance of copyright laws and strong protection against unauthorised copying to encourage investments in creativity and innovation, as well as in product and technological development. The scale of these investments in developing creative works and bringing them to market is certainly considerable. For example, according to the Publishers' Association there are around 600,000 books currently in print in UK. This is a hugely valuable knowledge resource for innovative industries and society at large. And of course, industries must be able to recoup these investments to pay for new generations of knowledge-based products. So, for example, the computer software industry argues that charging licence fees for its products allows companies to generate revenues to fund future R&D.

The prevention of unauthorized copying has always been the principal objective behind the development of international copyright rules and this remains the case. Unauthorised copying of copyrighted works (usually described rather more pejoratively as "piracy" by copyright holders) has a long history and remains an international phenomenon, occurring in both the developed and the developing world. The US, for example, justified its persistent refusal to grant copyright protection to foreign authors during the 19th century on the grounds that this was a necessity to meet the nation's needs for knowledge and enlightenment. And interestingly, although industry claims that current rates of unauthorised copying are highest in some developing countries and transition economies,[11] the biggest financial losses to rights holders still occur in developed countries, because their market size is so much bigger.[12] The arrival of the digital era has created the fear for the copyright-based industries that they may be able to sell "only one copy" of a new e-book, DVD movie, music CD, or computer programme before it is illegally copied, as a perfect replica at no cost, and may be distributed seamlessly worldwide through computer networks and the Internet.

In the past, however, the evidence shows that weak levels of copyright enforcement have had a major impact on diffusion of knowledge and knowledge-based products in certain cases, such as computer software, throughout the developing world. Indeed, it is arguably the case that many poor people in developing countries have only been able to access certain copyrighted works through using unauthorised copies available at a fraction of the price of the genuine original product. We are therefore concerned that an unintended impact of stronger protection and enforcement of international copyright rules as required, *inter alia,* by TRIPS will be simply to reduce access to knowledge products in developing countries, with damaging consequences for poor people.

Responding to this concern, representatives from the copyright-based industries point to the special initiatives they are undertaking for developing countries, such as donation schemes and low price "budget" editions of books and computer programmes for cost-sensitive users, as the way forward rather than any weakening of international copyright rules and/or enforcement measures in the developing world. For example, the publishing industry is now supporting an expanding number of initiatives aimed at improving affordable access to books and journals in developing countries and establishing partnerships with publishers in less developed countries to encourage the

development of local publishing industries.[13] Likewise, in the computer software industry, a leading software company is making several of its software products available to South Africa's 32,000 public schools at no charge, thereby helping South African students and teachers become IT-proficient, while helping to build its future markets.

But ultimately commercial companies are responsible to their shareholders. They are not charities, nor are they intended to be. Companies therefore think it is the responsibility of governments from developed countries and development agencies to meet developing countries' requirement for subsidised access to affordable copyrighted works in order to address their needs for education and transfer of knowledge. As noted in a report presented to the UK Parliament in 1977 and by a recent decision of the UK Copyright Tribunal no one has yet suggested that the makers of notebooks, compasses or rulers should supply them to educational establishments free of charge.[14] So why should the copyright-based industries tolerate widespread unauthorised copying of their books, journals, computer software or scientific databases?

We have considered these arguments carefully. We recognise the value of the voluntary initiatives being undertaken by industry for developing countries and think more could be done in this area. More generally, we are not convinced from our observation in different developing countries that, even from the rightsholder's perspective, the pricing of products is optimal. To the extent that copying, particularly on a commercial scale, is driven by the ratio of the selling price to the cost of producing copies, there must be scope for the use of more differential pricing in developing countries that would either be revenue-neutral or even revenue-enhancing for producing industries. The fact that publishers are prepared to support various schemes for low or no cost access for institutions in developing countries for on-line publications indicates that they recognise there is scope for differential pricing, with suitable safeguards. Whilst we fully accept that copyright holders have a right to appropriate returns from their investments just as other industries, we believe that from the wider public policy perspective, ultimately it is just as important to ensure that people in developing countries have better access to knowledge, as it is to ensure they have access to other essential inputs for development such as food, water and medicines. It is not clear to us that publishers, and software producers, have got the balance right in facilitating access in developing countries in ways that are consistent with their obligations to shareholders.

Publishers, both of hard copy and on-line books and journals, and software producers should review their pricing policies to help reduce unauthorised copying and to facilitate access to their products in developing countries. Initiatives being undertaken by publishers to expand access to their products for developing countries are valuable and we encourage an expansion of such schemes. The extension of free on-line access initiatives for developing countries to cover all academic journals is a good example of what could be done.

COPYRIGHT AND ACCESS

Educational Materials

In recent years, there has been a welcome expansion of primary and secondary education in developing countries, and aid has been concentrated rightly in these sectors. Whilst there are still major challenges in achieving "Education for All", developing countries and their donor partners are making significant progress.[15] Access to books and reading materials at primary and secondary levels in some countries has also improved. This is the result of increased levels of public expenditure on primary education and international book donation programmes, such as Book Aid International. And importantly, in some countries, it is also because local publishing industries, albeit often at an embryonic stage, are able to produce low cost schoolbooks and reading materials.[16]

However, access to books and learning materials is still a real problem in many developing countries. In 1999, research by the Association for Development of Education in Africa (ADEA), a

consortium of donors and developing countries, revealed that shortages of relevant, low cost books for use inside and outside school continue to undermine the provision of good quality education. Indeed, the conclusions of ADEA's research present a very depressing picture:

> "Uneven access to teaching and learning materials, inadequate provision of reading materials for the development of vital literacy skills and unacceptable pupil/book ratios continue to predominate. African publishers continue to be at a disadvantage in an economic context that tends to favour the import of books from abroad at the expense of those published in-country." [17]

But access to books and materials is important for other parts of the education system as well. Developing countries need educated people such as doctors, nurses, lawyers, scientists, researchers, engineers, economists, teachers and accountants. Without people skilled in these professions and a system of life-long learning and education, developing countries will be less able to absorb new technologies, generate innovation, and compete in the global knowledge economy. For example, even if developing countries can obtain cheap medicines they will still need trained doctors and nurses to administer them properly in order to save lives.

However, in many developing countries, particularly in Sub-Saharan Africa, the tertiary education sector has sunk to levels where it may soon no longer be able to provide minimum levels of teaching and research – and this at a time of growing demand for admissions for undergraduates.[18] With many developing countries already spending a significant proportion of GNP on education, they may be unable to find the additional resources required simply to maintain current levels of tertiary enrolments, let alone improve quality. Clearly, copyright is not the only issue with the weak tertiary infrastructure but high prices of books and materials and limited access to Internet-based resources are still important parts of a worsening crisis.

In the tertiary sector, the evidence indicates that access to books and other materials for education and research remains a critical problem in many developing countries, particularly the poorest. Most developing countries remain heavily dependent on imported textbooks and reference books, as this sector is often not commercially feasible for struggling local publishers to enter. The prices of such books are beyond the means of most students.

Libraries

University libraries should play a key role in supporting research and ensuring access to copyrighted books, journals and on-line materials for poor students in developing countries, but they are typically in a very poor state. Donor agencies have provided funding to modernise and re-stock libraries in a number of countries, including providing Internet connectivity and photocopying facilities.[19] More of this assistance is urgently needed. But donors' systems are just too slow and bureaucratic to enable libraries to maintain up-to-date textbook collections. Generally, the situation for university libraries in the poorer developing countries remains very bleak,[20] particularly in Africa, as a recent UNESCO report noted:

> "The downturn in the economic fortunes of African countries during the last decade or so has had a devastating effect on the quality of library services in academic institutions, virtually all of which are publicly funded. Most of them can no longer afford to buy new books, and large proportions of periodical subscriptions have been cancelled. With a corresponding inability to switch to the new information technologies, African university libraries in particular, and African academics in general, face a dim future indeed." [21]

Our consultations have also found that for better-resourced university libraries in developing countries, such as South Africa, there are sometimes serious problems in having to obtain copyright clearance and pay royalties for materials needed by teachers and students. And the evidence we have reviewed indicates that even these better-funded libraries have had to reduce their subscriptions to academic journals dramatically due to the high costs of maintaining up to date

collections. Indeed, even well resourced libraries in developed countries are experiencing extreme difficulty in continuing to stock the full range of journals their academics and students expect. In developed countries the rapid increase in subscription prices for academic journals, and ongoing consolidation in the publishing industry has fuelled an active debate on how researchers can maintain access to the materials they need, and the development of alternative models of on-line publishing such as BioMed Central.[22]

But developing countries also need to be allowed greater freedom to relax international copyright rules to meet their educational and research needs. As we have noted, delegates at the Stockholm conference proposed a package of such amendments to the Berne Convention in 1967. Developed countries rejected these proposals because they were considered to place too radical limitations on copyright protection. Examining the evidence 30 years later, it is clear to us that the special provisions for developing countries that were added to the Berne Convention in 1971, as set out in the Appendix, have not been effective. Further reforms are therefore needed, and different measures may be more or less important in meeting the specific needs in individual countries. As one commentator has put it:

> "In some cases, access to scientific journals and books at subsidized prices for a limited period would help greatly. In others, local publishers with limited markets need easy and inexpensive access to foreign books in order to translate them into the local language. In a different context, permission to reprint books from the industrialised countries in the original language is needed to serve an indigenous population literate in English or French but unable to pay the high cost of imported books. And for some countries, most of the elements of an indigenous publishing industry are missing and there is a need to build it up from scratch. Copyright may not be the key element in all of these circumstances, but it does play a role." [23]

In order to improve access to copyrighted works and achieve their goals for education and knowledge transfer, developing countries should adopt pro-competitive measures under copyright laws. Developing countries should be allowed to maintain or adopt broad exemptions for educational, research and library uses in their national copyright laws. The implementation of international copyright standards in the developing world must be undertaken with a proper appreciation of the continuing high level of need for improving the availability of these products, and their crucial importance for social and economic development.

COPYRIGHT AND COMPUTER SOFTWARE

As others have noted, there is a digital divide between the developed countries and the developing world. In the knowledge-based global economy, computer technologies are an essential requirement for accessing and using information, accelerating technology transfer and boosting the growth of productivity. At the same time, computer software products are perhaps the most heavily protected of all forms of knowledge-based products. Under the TRIPS Agreement, computer programmes now qualify for copyright protection just as any other literary work, as well as for other forms of IP protection, including by patents in some nations, such as the US.

Developing countries, of course, have a range of requirements for computer software applications in their industries, hospitals, schools and government offices. But most commonly, they need affordable access to off-the-shelf business software packages, such as word-processing, spreadsheet, e-mail and Internet browsing products. Companies in Europe and North America, with Microsoft being the major player, dominate the global market for these products. The software industries of developing countries, even in India, are mostly absent from the off-the-shelf, packaged computer programs sector.[24]

Copyright matters most in the computer software industry to the off-the-shelf business applications sector. Unlike bespoke software applications, these products have a mass market and can be easily

copied. Copyright protection enables companies to prevent copying, limit competition and charge monopoly prices for these products. In developing countries, this presents two main problems.

First, as there is currently widespread copying together with low local purchasing power in developing countries, there is a concern that stronger protection and enforcement could mean a more limited diffusion of such technologies. This may be a particular risk because the network effects of business applications tend to re-enforce the dominance of existing software producers. Examining the evidence, however, we conclude that this problem is not insurmountable for developing countries, if the right steps are taken. For example, governments and donor organisations could review their software procurement policies with a view to giving greater consideration to low cost business software products, including generic and open-source products that are widely available.[25]

The second problem is that where the source code of software is also protected, this may make it harder to adapt the products for local needs. It may also restrain competition in development of inter-operating applications, through follow-on innovation by reverse engineering. Under TRIPS, developing countries are permitted the flexibility to allow reverse engineering of software, so this problem may be avoided if national copyright laws are drafted appropriately. As another practical measure, more widespread use of the various open source software[26] products, where source code is made available unlike proprietary software, may be considered.[27] Alternatively, some in industry argue that with stronger copyright enforcement, closed source proprietary developers may be more willing to make source code available to software developers in developing countries.

It is clearly beyond our mandate to recommend what kind of policies developing countries should follow for procurement of computer software. For instance, whilst low cost or open source software may *a priori* offer cost and other advantages over proprietary software, many factors besides software license fees affect the total cost of an IT system such as customising the system to the user's specific needs, as well as servicing, and maintaining the system. That said, given the considerable needs which developing countries have for information and communication technologies and the limited funds which are available, it would seem sensible that governments and donors should certainly consider supporting programmes to raise awareness about low cost options, including open source software, in developing countries.

Developing countries and their donor partners should review policies for procurement of computer software, with a view to ensuring that options for using low-cost and/or open-source software products are properly considered and their costs and benefits carefully evaluated. Developing countries should ensure that their national copyright laws permit the reverse engineering of computer software programmes beyond the requirements for inter-operability, consistent with the relevant IP treaties they have joined.

DELIVERING THE POTENTIAL OF THE INTERNET FOR DEVELOPMENT

There is reason to hope that the information technology revolution has the potential to increase access to information and knowledge in developing countries. Rapid advances in two key technologies – digital information storage/processing and satellite/optical fibre communications – are creating faster and cheaper ways of accessing and using knowledge around the world. The growth of the Internet is a prime example. In mid-1993, there were fewer than 200 websites on the Internet but by late 2000, there were 20 million; and the number of Internet users is expected to reach 1 billion by 2005, though most of these will still be in the developed countries (UNDP 2001). Table 5.1 shows the dramatic contrasts in Internet usage in developed, developing and least developed countries.

Table 5.1 Internet Connectivity in the Developed and Developing World in 2000

	Internet Users (millions)	Population (millions)	Internet Users per 10,000 people
Developed Countries	253.2	860	2944
Developing Countries	107.0	4500	238
Least Developed Countries	0.7	780	9
Total	**360.9**	**6140**	**588**

Source: *ITU (2001), as quoted in Story (2002) Appendix 4*

The growth of the Internet offers real opportunities for improving access and transfer of knowledge for developing countries. For example, the growing size and number of digital libraries creates unprecedented kinds of access to all published information anywhere in the world. In the future, developing countries may be able to build a national digital network to provide access to library resources from around the world to every remote village, as is being done in Australia.[28] Similarly, initiatives such as the African Virtual University (AVU) are showing the potential of the Internet as a tool and resource for distance learning in the developing world. Since its launch in 1997, more than 24,000 students in 17 African countries have completed semester-long courses in technology, engineering, business and the sciences through the AVU. It also provides students with access to an on-line digital library with over 1,000 full text journals and the AVU website currently receives more than 1 million hits per month.[29]

Technological Restrictions

But there are also threats to access and diffusion of knowledge and technology from these technological changes. There is a growing trend within the publishing and software industries towards distribution of content on-line, together with access restrictions enforced by digital rights management systems, such as encryption technologies. This sophisticated form of technological protection rescinds traditional "fair use" rights to browse, share, or make private copies of copyrighted works in digital formats, since works may not be accessible without payment, even for legitimate uses. For developing countries, where Internet connectivity is limited and subscriptions to on-line resources unaffordable, it may exclude access to these materials altogether and impose a heavy burden that will delay the participation of those countries in the global knowledge-based society.

In terms of the relationship of this trend with IP rules and the potential of the Internet for development, there are three factors that have further significance for developing countries.

First, the WIPO Copyright Treaty establishes new rules that may soon become the international standard.[30] It clarifies copyright holders' exclusive rights over material in the on-line environment and specifically calls for countries to provide effective legal remedies against the circumvention of technological protection measures restricting types of access that are not authorised by the copyright holder or permitted in national law. As of April 2002, 35 countries had ratified the treaty, including Burkina Faso, Mali and Gabon. An important concern here is that developing countries will come under pressure, for instance in the context of bilateral agreements with developed countries (see Chapter 8), to accede to the WIPO Copyright treaty, or even to adopt stricter

prohibitions against circumvention of technological protection systems and effectively thereby reducing the scope of traditional "fair use" in digital media.

In the US, the Digital Millennium Copyright Act (DMCA) of 1998 enacted the WIPO Treaty but went beyond it. In particular it gave a strong boost to the use of technological protection by making it illegal to circumvent technological protection used by publishers, or to develop or distribute devices that do so. Such acts are illegal even for uses that would not hitherto have infringed on copyright (which is not the case with the WIPO treaty). This deeply compromises the principles of "fair use" which have been established under copyright, as also the principle of first sale. In the case of a book you are free to resell it to someone else – technological protection may prevent the equivalent digital act. Finally, technological protection is indefinite, whereas copyright is time limited (albeit the time seems to keep increasing).

Secondly, certain quarters of the "content" industries are calling for governments to enact legislation that require manufacturers of computer technology to build-in devices to prevent unauthorised copying of digital works. For example, Michael Eisner, chairman and chief executive of the Walt Disney company, asserted in a article in the Financial Times on 25 March 2002 that:

> "We are now at a crossroads. The primary goal must be for the creators of content and the creators of computer technology to come together to agree on appropriate technologies to hinder the unauthorised duplication and transmission of copyrighted materials. The US government has an important role to play, by setting a reasonable deadline after which, if no progress has been made, it will step in to mandate technological standards to protect copyrighted works from unlawful exploitation."

Thirdly, specifically in relation to scientific or technical electronic databases, it is possible that developing countries will be encouraged to adopt a special regime of IP protection, in addition to the limited protection already provided under TRIPS and the Berne convention (see Box 5.2). Such a *sui generis* protection regime was introduced in the 15 countries of the European Union in 1996.[31] Aided by the fact that the EU's database regime only provides protection for foreigners on a reciprocal basis, similar proposals have been before the US congress for a number of years (for example, the draft Database Investment and Intellectual Property Anti-Piracy Act of 1996). The EU and the US also tabled proposals for an international treaty on database protection at the 1996 WIPO Diplomatic Conference.

Digitalisation and the potential for instant, low-cost global communication have opened tremendous new opportunities for the dissemination and use of scientific and technical databases in developing countries, as elsewhere in the world. Indeed, the ability to access existing databases and to extract and recombine selected portions of them for research has become a key part of the scientific process. However, commercially-owned private sector databases typically seek to control unauthorised access in order to maximise revenues from subscriptions, even when some of the data they contain may be in the public domain or collected through publicly funded research. Our central concern here, therefore, is that a strengthening of IP protection for databases at the international level, whilst encouraging more investment in new commercial database products and services, may at the same time greatly reduce the access of scientists and researchers in developing countries to the data they contain because they will often lack the financial means to pay for the necessary subscriptions.

It is clear that the issues surrounding access to information and knowledge over the Internet are still emerging. In some respects, they are of limited immediate importance in many developing countries, given these nations' limited Internet connectivity. However, Internet issues are crucial to universities and scientific research in the developing world, and may soon be central to secondary and even primary education in developing nations since Internet access will be much less expensive than the construction and stocking of libraries. The Internet has remarkable potential for development and it is imperative that this is not lost.

Box 5.2 IP Protection of Databases

IP protection of databases is a very important issue for science, research, innovation and creativity, given the global proliferation of computerised information services. Advances in information and communication technologies have made digital databases of factual information an essential resource for accelerating the growth of knowledge and for producing new discoveries. And the expansion of the Internet facilitates their wide dissemination and easy use. At the same time, the same technologies make unauthorised uses and wholesale misappropriation of these valuable databases relatively simple. The central issue here is, on the one hand, the balance between addressing concerns of database creators regarding the provision of incentives and protecting investment in new database products and services and, on the other, safeguarding customary access to the data they contain by users from the scientific, education and library communities.

In most countries, databases qualify for IP protection through trademark and copyright legislation (they may also be protected de facto through contracts between the users of the database and the service provider). However, protection for databases under copyright law is limited. The Berne Convention protects compilations or collections of works but is silent on the protection of collections of material other than works that are themselves copyrightable. In the famous 1991 case of *Feist Publications Inc. v. Rural Telephone Service Co.,* the US Supreme Court denied protection to a telephone directory on the grounds that the collecting of names, addresses and telephone numbers was not an original creative work.

Under the EU's *sui generis* regime, introduced in 1996, database creators have the right to prevent extraction of the whole or a substantial part of the contents of the database for a period of 15 years, although this term of protection is renewable whenever substantial change is made (for example, through adding more data). The argument that the EU's regime is designed to protect investment rather than original creative expression is supported by the fact that in order to gain protection, the creators need only show that they have made a "substantial investment" in developing the database.

More analysis needs to be undertaken about the best means of protecting digital content and the interests of rightsholders, whilst at the same time honouring principles that ensure adequate access and "fair use" for consumers. More specifically, policymakers need to gain a better understanding of the impacts of the trend towards on-line distribution and technological protection of content on developing countries. There is a possibility that much such material will be protected technologically or through contractual provisions that are imposed as a condition of accessing the material. And it is not clear how reasonable requirements of "fair use" will be guaranteed in such an environment.

Bearing in mind this considerable level of uncertainty, we conclude that it is premature at the present time for developing countries to be required to go beyond TRIPS standards in this area. We believe developing countries would probably be unwise to endorse the WIPO Copyright Treaty, unless they have very specific reasons for doing so, and should retain their freedom to legislate on technological measures. It follows that developing countries, or indeed other developed countries, should not follow the example of the DMCA in forbidding all circumvention of technological protection. In particular, we take the view that legislation such as the DMCA shifts the balance too far in favour of producers of copyright material at the expense of the historic rights of users. Its replication globally could be very harmful to the interests of developing countries in accessing information and knowledge they require for their development. Similarly we have concluded that the EU Database Directive goes too far in providing protection for assemblages of material and will restrict unduly access to scientific databases required by developing countries.

Users of information available on the Internet in the developing nations should be entitled to "fair use" rights such as making and distributing printed copies from electronic sources in reasonable numbers for educational and research purposes, and using reasonable excerpts in commentary and criticism. Where suppliers of digital information or software attempt to restrict "fair use" rights, by contract provisions associated with the distribution of digital material, the relevant contract provision may be treated as void. Where the same restriction is attempted through technological means, measures to defeat the technological means of protection in such circumstances should not be regarded as illegal. Developing countries should think very carefully before joining the WIPO Copyright Treaty and other countries should not follow the lead of the US and the EU by implementing legislation on the lines of the DMCA or the Database Directive.

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[1] Story, A. (2002) *"Copyright, Software and the Internet",* Commission on Intellectual Property Rights Background Paper 5, Commission on Intellectual Property Rights, London, p.11. Source: http://www.iprcommission.org

[2] UNESCO (1998) *"World Information Report 1997/98",* UNESCO, Paris, p.320. Source: http://www.unesco.org/webworld/com_inf_reports/wirenglish/chap23.pdf

[3] See, for example, Oman, R (2000) *"Copyright – engine of development",* UNESCO, Paris. Note that this is available on the Web as an e-book with an access fee of £10.67. This fee allows one to browse the book on-line but not print it out in hard copy. It is a good example of technological protection on the Internet. Source: http://upo.unesco.org/ebookdetails.asp?id=3004

[4] The source of this data is the Indian National Association of Software and Service Companies (NASSCOM) http://www.nasscom.org/it_industry/sw_industry_home.asp

[5] Bgoya, W. et al (1997) *"The Economics of Publishing Educational Materials in Africa",* Perspectives on African Book Development series, ADEA Working Group on Books and Learning Materials, London. Source: http://www.adeanet.org/trans/Econ%20of%20publishing_ENG/Economic%20eng.pdf

[6] Story, A. (2002) p.53.

[7] World Bank (1999) *"World Development Report 1998/99: Knowledge for Development",* World Bank, Washington DC, p14. Source: http://www.worldbank.org/wdr/wdr98/

[8] For a history of the Protocol and Appendix, see Ricketson, S. (1987) *"The Berne Convention for the Protection of Literary and Artistic Works: 1886-1986",* Kluwer, London, Chapter 11.

[9] Ricketson, S. (1987), p. 591

[10] Correa, C. M. (2000) "Fair Use in the Digital Era", UNESCO, Paris. Source: http://webworld.unesco.org/infoethics2000/documents/paper_correa.rtf

[11] For example, the Business Software Alliance estimates computer software infringement levels of 97% and 94% in Vietnam and China respectively in 2000. Business Software Alliance (2001) *"Sixth Annual BSA Global Software Piracy Study",* BSA. Source: http://www.bsa.org/resources/2001-05-21.55.pdf

[12] For example, North America, Western Europe and Japan alone account for over 65% of global revenue losses from counterfeit computer software, Business Software Alliance (2001). It should be noted that the methodology of these studies has been criticised. The description indicates that they are based on the difference between estimated installed software and estimated legitimate supply, valued at the prices of legitimate supply. No reference is made to the fact that, in the absence of "piracy", additional legitimate sales would necessarily have been much lower. On this basis, some have claimed these are very substantial overestimates of lost sales revenue.

[13] The range and number of such initiatives makes it impossible to describe them all here, but perhaps the best known example is the WHO-sponsored Health Internetwork Access to Research Initiative (HINARI) offering free on-line access to 100 developing countries to around 1000 leading medical journals. For a more comprehensive listing of such access initiatives for developing countries see: http://www.alpsp.org/htp_dev.htm or http://www.library.yale.edu/~llicense/develop.shtml

[14] Report of the committee to consider the law on Copyright and Designs under the chairmanship of Mr Justice Whitford (the Whitford Report), presented to the UK Parliament in 1977; UK Copyright Tribunal interim decision in Universities UK v. CLA September 2001 Source: http://www.patent.gov.uk/copy/tribunal/uukvcla.pdf

[15] See, for example, UNESCO (2001) *"Monitoring Report on Education for All",* UNESCO, Paris. Source: http://www.unesco.org/education/efa/monitoring/pdf/monitoring_report_en.pdf

[16] Altbach, P. (1995) *"Copyright and Development: Inequality in the Information Age",* Bellagio Publishing Network, Boston MA; and Bgoya, W. et al (1997).

[17] The Association for Development of Education in Africa (ADEA) Working Group on Books and Learning Materials. Source: http://www.adeanet.org/workgroups/en_wgblm.html

[18] During the 1980s public expenditure per tertiary student in Sub-Saharan Africa dropped from $6,300 to $1,500 in real terms, and the 1990s have witnessed a further decline of an estimated 30%. Saint, W. (1999) *"Tertiary Distance Education and Technology in Sub-Saharan Africa",* ADEA Working Group on Higher Education, Washington DC.

[19] For example, according to UNESCO (1998), the World Bank granted a $15.8m loan to the Senegal Government for the improvement of library services in the Cheikh Anta Diop University of Dakar.

[20] For example, at the University of Dar es Salaam in Tanzania, classes of 100 students chasing one copy of a library textbook are common and the textbook collections are often two editions out of date. Rosenberg, D. (1997) *"University Libraries in Africa: A Review of their Current State and Future Potential",* International African Institute, London.

[21] UNESCO (1998), Chapter 4.

[22] See "Journal Wars" *The Economist,* 10 May 2001.

[23] Altbach, P. (1995), p.7

[24] This situation is unlikely to change quickly. There are considerable non-IP related barriers that prevent software firms in developing countries from entering the off-the-shelf market at a significant level, at least for the short and medium term. These barriers include the small domestic market size in developing countries, which totals less than 5% of the global software market. OECD (2000) "*Information Technology Outlook 2000*", OECD, Paris, p.67.
Source: http://www.oecd.org/dsti/sti/it/prod/it-out2000-e.htm

[25] To give one example, the "StarOffice" suite of business software, produced by Sun Corporation, is reportedly fully inter-operable with Microsoft's highly popular "Office" product and is available to download free of charge from the companies' website.

[26] See Glossary for definition.

[27] A famous example of open source software is "Linux", a Unix-like operating system for personal computers, developed at the University of Helsinki in 1991 and freely available. Linux is distributed with its source code under a "general public license".

[28] Lyman, P. (1996) "What is a Digital Library? Technology, Intellectual Property, and the Public Interest", *Daedalus: Journal of the American Academy of Arts and Sciences,* vol. 125 No. 4, p. 12

[29] For more information, see www.avu.org

[30] The WIPO Diplomatic Conference in December 1996 led to the adoption of two new treaties, the "WIPO Copyright Treaty" (Source: http://www.wipo.org/eng/diplconf/distrib/94dc.htm) and the "WIPO Performances and Phonograms Treaty" (Source: http://www.wipo.org/eng/diplconf/distrib/95dc.htm) dealing respectively with the protection of authors and the protection of performers and phonogram producers.

[31] EC Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases. Source: http://europa.eu.int/ISPO/infosoc/legreg/docs/969ec.html