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Electronic Information Management and Intellectual Property Rights

Graham P. Cornish
 Consultant
 Copyright Circle
 33, Mayfield Grove
 Harrogate
 North Yorkshire HG1 5HD
 United Kingdom

Abstract

The paper examines the concept of "digital is different" or not as the case may be and how and if digital publications are different from their paper counterparts. The concept of copyright in a digital age is explored and various different interpretations of the concept and its application discussed. The linguistic problems of using words from a paper-based environment will be considered and such basic words as "copyright", "copy", "author", "publisher" and "user" are put in a new context. Ideas such as databases, fair use and exceptions are explored in their relationship to technological measures to control copyright material by owners. Technological devices to control access to copyright material are explained using examples from the CITED, COPYSMART, IMPRIMATUR, and COPYCAT projects of the European Union. Mechanisms such as fingerprinting, watermarking and stamping are compared from a user/owner point of view rather than as detailed technology. The impact of the latest EU directive on copyright and the information society is explained in detail and the complexities of implementing this directive in different legal regimes and cultural environments will be drawn out.

1. Introduction

Intellectual Property rights are often a difficult concept to grasp in a world which is intensely focused on the material world. Intellectual Property Rights (IPR) are not in themselves tangible objects and therefore are often overlooked, ignored or even dismissed by many working in areas where they are actually crucial to the exploitation of what is being made, invented or thought about.

2. The basics

Essentially Intellectual Property is a concept to protect the creativity of the human mind and in most jurisdictions is divided into a series of different types. These will be examined briefly but the emphasis of this chapter will be on copyright. There are basically four elements in IPR although other, more subtle, divisions can be detected and refined in both law and practice. There is protection for invention, protection for manufacture, protection for design and protection for the expression of ideas. Many objects may contain more than one of these areas in them and will therefore enjoy multiple protection.

3. The owners' and authors' rights

When we create something we do two things: we put something of ourselves into it and we become vulnerable to the outside world. Let's say you paint a picture and show it to someone. They may laugh at your efforts, criticize your brushwork or say it is inspirational. Whatever the reaction you will take it personally as either praise or criticism of yourself, not just your artwork. This is just as true of an internal memo in the company or a scientific paper in a journal. You may have had a brilliant flash of insight into a real problem or simply made a fool of yourself by misunderstanding the company approach or the scientific evidence.

It follows that what we create we should also control. From this comes the idea of copyright because the action we want to control is *copying* our work, whatever form that copying may take. The need to control may be because we are worried that someone will alter our work in some way or because they may deprive us of some money. It is important to realize that the copyright is quite separate from the work in which it subsists. The fact that you buy a book does not give you any control over the copyright in the book. Let us once again consider the painting.

The painting an artist painted may be a good one and could sell for quite a lot of money. So the artist will want to control what happens to the actual painting and also what people do with it. Hanging it on the wall in the buyer's house is OK but what if they want to make postcards of it and sell them in the local gift shop? The artist will probably feel this is unfair and they are making money out of their ability to paint.

Therefore the law in most countries gives authors and owners a set of rights which vary from one type of IP to another. These can be summarized as follows:

Patent	Right to make the object patented
Design right	Right to prevent others using the design or making things from it
Trademark	Right to market goods or services under the label
Copyright	Right to copy, issue copies, perform, broadcast, translate or adapt.

In addition to these essentially "economic" rights many countries give authors certain "moral" rights. In the Anglo-Saxon legal tradition these are very weak as that system is essentially based on the economic value of IP, but in Roman law and related traditions authors enjoy certain "moral" rights as well. These co-called moral rights are essentially related to the integrity of the person creating the work and therefore, by extension, to the work itself. In brief these rights are:

- (a) To have the author's name included when the work is published
- (b) To prevent significant parts of the work being removed
- (c) To prevent significant additions being made to the work
- (d) To prevent significant alterations to the work
- (e) To prevent someone else's name being added to the work
- (f) To prevent works being attributed to someone when they did not create them.

These may seem rather philosophical and even ethereal in nature but they become central to many of the later discussions on managing these rights in an electronic environment.

3.1. Patents

A patent gives an inventor the right for a limited period to stop others from making, using or selling an invention without the permission of the inventor. Patents are generally interested in functional and technical aspects of products and processes, and must fulfill specific conditions to be granted. Most patents are for incremental improvements in known technology - evolution rather than revolution. The technology does not have to be complex. Patent rights are territorial; a UK patent, for example, does not give rights outside of the UK. Patent rights last for up to 20 years in many jurisdictions but terms can vary and renewal is often required in some circumstances. This is a quote from the UK government's Patent Office website at www.intellectual-property.gov.uk.

It is not always clear who owns an invention, and there are potential pitfalls with patents. Despite these, a patent can be of use to an inventor, and can also benefit other people. You can arrange, through means of a licence or sale to use another inventor's patent. Additionally, large amounts of information can be learnt from other people's patents.

Sometimes items which would seem clear candidates for registering a patent are not in fact registerable. For example, computer programs. It is possible to patent programs for computers which, when run on a computer produce a "technical effect". However, if a program does not produce a technical effect when run on a computer it is unlikely to be patentable. A technical effect is generally an improvement in technology, and needs to be in an area of technology which is patentable.

For instance, an improved program for translating between Japanese and English is not patentable because linguistics is a mental process, not a technical field. On the other hand a program which speeds up image enhancement may be patentable because it produces a technical improvement in a technical area.

3.2. Trade Marks

A trademark is any sign which can distinguish the goods and services of one trader from those of another. A sign includes words, logos, colours, slogans, three-dimensional shapes and sometimes sounds and gestures. A trademark is therefore a "badge" of trade origin. It is used as a marketing tool so that customers can recognize the product of a particular trader. To be registerable in many jurisdictions it must also be capable of being represented graphically, that is, in words and/or pictures. A trademark that is not exploited can lapse after a given period of time but if it is used and renewed if necessary it can last indefinitely.

3.3. Designs

Designs are protected in different ways in various countries but the EU has standard rules for protecting design right. A design refers to the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation. Owners of design right may need to rely on copyright or industrial property rights of various kinds. Some countries offer protection by three legal rights;

- registered designs
- unregistered design right
- and artistic copyright

The design of a product can be synonymous with the branding and image of a company and can become an asset to them with a monetary value that could increase. Design registration usually gives the owner, a monopoly on his or her product, i.e., the right for a limited period to stop others from making, using or selling the product without their permission and is additional to any design right or copyright protection that may exist automatically in the design. Registering a design gives the owner the right to take legal action against others who might be infringing the design and to claim damages. Registering can also deter a potential infringement and also brings the exclusive right to make, import, sell or hire out any article to which the design has been applied or to let others use the design under the terms agreed with the registered owner.

3.4. Copyright

The idea behind copyright is rooted in certain fundamental ideas about creativity and possession. Basically, it springs from the idea that anything we create is an extension of 'self' and should be protected from general use by anyone else. Coupled with this is the idea that the person creating something has exclusive rights over the thing created, partly for economic reasons but also because of this extension of 'self' idea. Copyright is therefore important to ensure the continued growth of writing, performing and creating. Copyright law aims to protect this growth but, at the same time, tries to ensure that some access to copyright works is allowed as well. Without this access creators would be starved of ideas and information to create more copyright material. Copyright is not something that can be registered: the Berne Convention for the Protection of Literary and Artistic Works, to which most countries belong, prohibits registration as a condition of claiming copyright. Copyright does not often last indefinitely. As a general rule it expires 70 years from the end of the year in which the author dies although there are different rules in many countries for works without authors, unpublished documents and those created by government or other institutions. From the point of view of electronic information copyright is by far the most important right. Table 1 summarizes the types and characteristics of intellectual property rights.

Table 1. Types and characteristics of intellectual property rights

<i>Type of IP</i>	<i>Protects</i>	<i>Lasts for</i>	<i>Registerable or not</i>
Patents	inventions	20 years approx.	registerable
Design right	appearance	10-15 years	can be registered or not
Trade marks	distinguishing sign	indefinite	registerable
Copyright	expressions of creativity	70 years after death	not registerable

Note: This table gives examples only and is not a legal guide to any jurisdiction.

3.4.1. Rights in an electronic world

Apart from some possible uses of computer software, patents are not relevant to the electronic *information* world as they relate to manufacturing objects. Design right applies also to making things although the documents containing the design will almost certain be electronic in today's processes. Trademarks will be highly relevant in terms of branding services and products such as Dell Computers, AOL online or Netscape Navigator as well as the thousands of products about which information is available through the Web. The greatest complexity in IP terms for electronic information is copyright and this chapter will concentrate on this issue although the other rights will be discussed as appropriate where they arise.

It is important to realize that whatever is said about "electronic rights" is usually derived from fundamental principles discussed above and is often the result of a long and complex evolutionary process which has seen copyright, for example, changing from a right to protect publishers to one that protects authors (Feather 1994). Although supplementary laws have been passed in many countries to accommodate technological developments these invariably build on existing principles. The EU Directive on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society does try to introduce additional rights but these are still built on the basic ideas behind copyright as such (European Parliament 2001).

3.5. Databases

Some materials are not considered by all legislations to be suitable for copyright protection. For example, directories, lists of organizations or people or simple bibliographies. Nevertheless such items are the result of considerable investment in terms of money, labour and technical skill. For this reason the EU introduced a directive to regulate this situation. As a consequence any thing qualifying as a database is now protected in the EU by a special Database right. This lasts for only 15 years instead of the usual 70 but is capable of being automatically renewed or extended each time the database has significant changes made to it. Thus a dynamic database will be continually updated and therefore the 15 year protection "clock" will continue to tick until the time when the database is shut down and no longer active. This right protects all kinds of valuable products which do not demonstrate any kind of creativity in terms of original thinking.

3.6. Ownership and protection

Although these rights are intangible in themselves, they nevertheless exist in law and usually have the same status as any other property right. They therefore have to be protected from unlawful use and exploitation in the same way as any other property such as land, equipment or buildings. This means that IP is essentially a matter of law relating to personal property and is dealt with according to the legal tradition of the country concerned. Major acts of piracy will probably be dealt with by the police on behalf of the owner but other misuse will have to be dealt with through civil procedures of one kind or another.

It is important to note that authors and owners may, or may not, be the same person or institution. Authors create (write, compose, paint, carve, draw, perform, etc.) and owners own the rights mentioned above. Usually the author is the first owner of the rights which the law gives but this may not be true of works created as part of the author's employment. In this case the rights belong immediately to the employer and this is true in nearly all countries. However, most authors cannot exploit their works in any commercial sense without the assistance of some kind of publisher, whether it is a conventional commercial publishing house, a government agency, a research institution or a website host. In return for making the work widely available

the organization doing this will almost certainly want some rights over the work in return. As all IP is a tradable commodity this can be done in the form of outright selling, licensing for a specific time-span or purpose or format. Authors can set all kinds of conditions on the sale or lease of their IP rights and usually do so. However, this process immediately makes clear the distinction between the rights that *authors* enjoy and those that *owners* have and why different people may have different rights in the same work.

3.6.1 What needs managing?

Given that copyright is both an economic and personal (moral) right, why is there a need to manage it in any particular way? Essentially this is because the very nature of the property protected by copyright (and other IPRs) is intrinsically different from that protected by the usual laws governing theft, trespass and even fraud. Authors and owners have two sets of rights to consider and protect which is rarely the case in the purely material world. The mechanics behind making available physical goods and IPRs are fundamentally different. Selling, renting or lending a physical object deprives the owner of the use of that object either permanently or on a time-limited basis under agreed terms. Usually this means that money has been paid for the acquisition or temporary use of the item. Someone may buy a car or rent it for a holiday. In either case the original owner parts with the car and the new owner/holidaymaker has the right to use it instead. An object has passed from owner to user: $1-1 = 0$ (the owner) and $0+1 = 1$ (the user). In the case of many IPRs, especially copyright, the mathematics are quite different. The information is provided (free or at a price) by the original owner or creator (author). It then passes to the user but, in this case, the owner still retains the original information but the user (buyer) also has it. A market research company produces a report on how much coffee is produced in Brazil each year. This information is read by researchers, coffee marketers and economists who may have paid for it or heard it on the TV or simply read it in a newspaper. The information remains with the original owner but it has been spread to a large number of others *as well*. The mathematics are $1-1 = 1$ (the owner) and $0+1 = 1$ (the user) – a quite different outcome. For this self-evident reason (but it is always worth stating the obvious when dealing with a complex issue) special laws relating to IP are necessary and therefore different management techniques are needed to exploit and protect it properly.

3.6.2. Moral rights

Authors enjoy the moral rights mentioned earlier – basically integrity of the work and acknowledgment as the author. These rights in the past have been managed in a very elementary way. Authors enjoyed them as an absolute right in countries such as France and Germany but did not enjoy them at all in the UK and Ireland until well into the 1980s and then only on a very restricted basis. In the UK, for example, such rights have to be asserted in writing to the publisher and apply only to monographs and films. Neither do they apply to works created as part of employment. If such rights were infringed then the author has the absolute right to take the publisher to court to put the matter right and obtain damages.

3.6.3. Economic rights

More far-reaching and of much greater significance to the commercial world are the economic rights that owners enjoy. Owners are more likely to be companies, publishing houses, film companies or sound recording firms than individuals. Owners of copyright enjoy a series of rights which vary somewhat from one country to another but can be summarized as follows:

- Copy the work
- Make the work publicly available
- Perform, show, play or broadcast
- Adapt or translate
- Lend or rent the work.

These rights were traditionally managed through the courts because it was comparatively easy to spot when someone had copied a work, whether it was a scientific paper, musical disc, photograph or film. If copying was identified then appropriate action could be taken. However, as most copying was, and often still is, of a small nature (individual copies for personal use, small parts of a film for demonstrating a technique or

personal viewing at home) owners rarely took action unless this was thought to be symptomatic of much more extensive copying. To cope with this situation some countries (notably the UK, Ireland and Scandinavian countries) developed a concept of "fair" use of copyright works. This made legitimate the occasional use of works for various (and varying) purposes provided it did not seriously harm the interests of the copyright owner. This is actually allowed in the Berne Convention (Article 9.2). Owners often regard this "concession" as a result of what is called market failure. In other words, the owners have failed to find a way of meeting the needs of users by allowing them to make limited copies in return for permission and/or a fee. Therefore the market has failed to meet a need and so the law steps in and fulfils that need anyway.

Making a work public was also easy to detect and this was most often in the form of pirate versions of books, videos or discs. In the same way performing a work in public, showing a film or broadcasting something was easy to trace and appropriate action could be taken to recover any lost revenue and prohibit this happening again without the owners consent. This is equally true of lending and rental.

Transforming a work was often less easy to detect as the transformation may have been so extensive that the original could not be easily identified. Whilst we may think of this in terms of books being changed into plays or films (in the latter case the film often bears little resemblance to the original story!!) this is equally a problem with maps, computer software and scientific articles which are frequently plagiarized by students of all levels.

The only real course of action for owners is to threaten some kind of legal action once the infringement has been discovered. A warning letter will be sufficient for small offences but it may be necessary to take the offending person to court which is expensive for both owner and infringer and the outcome is never totally certain.

3.6.4. Owners' needs

It is clear that all these remedies are retrospective. If an infringement is detected then action is taken against the offending person or institution and recompense is sought and steps taken to prevent the infringement continuing (if appropriate). Such action is often taken, not only because of the economic damage of the actions actually committed but as a warning to others that the owner will not tolerate infringement of rights. Whilst remedies are appropriate, most owners would prefer to take proactive action to prevent infringement and ensure a proper respect for their property and economic returns on it when possible.

3.7 Language in the electronic environment

A major problem when talking about intellectual property in the electronic environment is the language used. Essentially the words traditionally used in publishing and writing are still used when talking about digital products or the Web. This means that there can be misunderstandings and a few examples will highlight the problems.

Copy. Whilst we may understand that a copy is a reproduction in some form of the original (photocopy, scanned image or even hand drawn) what is meant by a copy when using a website for example? Many "copies" are made between the homepage and the end-user, often via Internet Services Providers (ISPs) and even on to the user's hard disk but do they all count as copies or merely transfers of digital data? If someone sends an identical email to twenty people all at the same time are they twenty copies or twenty simultaneous transmissions of the same message?

Journal. The concept of the scholarly journal is well established in academic and scientific circles but what is an electronic journal? The journal is usually a package which contains various items such as articles, letters to the editor, advertisements, announcements of meetings and even a contents page or index. Subscribers buy the package whether or not they want everything in it. But in an electronic context such packaging is not necessary in one sense as the user can pick and choose which elements may be wanted or discarded. The "brand name" of a journal however may be vital (see the remarks on peer review) so the concept needs to continue but not as it is today.

Document supply. By this is usually meant the transfer of a copy of a document from one place to another, usually between libraries initially but for the benefit of the end-user. When something is sent digitally what is transferred? The image is certainly made available in another place but is it necessarily actually supplied for retention. It may be a system to allow temporary access, not dissimilar to actually lending something.

3.8. Managing in the electronic context

But owners have other interests besides enforcing the legal rights they enjoy in each country. In the current technological climate both creators and users of intellectual property have certain basic needs which must be satisfied if they are to be assured their material can be safely released in electronic form. Although it would be easy to categorize the needs of owners as *protection* and those of users as *access*, this is a very simplistic approach and many more requirements need to be examined before any comprehensive system of electronic control can be put into place.

3.8.1. Owners' needs

In the case of rights owners the need for protection should not be seen so much as *preventing* use of their material as *controlling* that use (Van Slype & Van Halm 1988). Basically a rights owner needs to be able to control:

- a) copying from paper on to paper
- b) copying from paper into electronic formats
- c) copying from electronic formats to paper
- d) copying from electronic format to electronic format including storage and transmission
- e) multiple copying.

Clearly items (a) and (e) are issues in the paper environment and (b) is primarily an issue for producers of paper documents whilst (c) and (d) are entirely new issues to be faced.

The rights owner may also wish to be able to operate:

- a. Differential pricing for sector, group, type of use. For example, different parts of a database may be priced differently for access depending on the value of the content. A senior researcher of academic could be given access to the whole database because such a person would have the necessary economic power but access for a student may be more limited because of the cost involved or even because the rights owner does not wish some material to be made readily available to students for reasons of sensitivity or security.
- b. Differential pricing for individual elements within a product such as specific journal articles, elements in a directory or areas of a classification arrangement

These are entirely new concepts in publishing which could not be achieved in a paper world. The best that could be achieved was differential pricing of a total product such as a journal title. Different subscription rates for institutions, libraries and individuals are common. An example of this is Haworth Press in the USA which has had three levels of pricing for its products for many years.

The rights owner also needs:

- a. Protection against unauthorized use by groups or sectors who may not have purchased any or all of the rights to do the actions mentioned above
- b. Protection against unauthorized use of products. Not everyone wants their music used to promote motor cars or their writings used in political campaigns!
- c. A system which provides data on use for marketing purposes. Information intermediaries, by penetrating previously untapped markets, will be able to provide considerable data on potential marketing for products and services.
- d. A system which will ensure compensation for all actions over which the rights owner has exclusive control. Collection of royalties and fees, even if set at zero levels, needs to be achieved efficiently and effectively.

Of these needs only (d) has been partially achieved in the paper world usually by the blunt instrument of collection societies. In the electronic context these are new concepts which need to be managed in new ways.

3.8.2. The intermediary's needs

In the past owners (and authors) rarely distributed their material directly. Most, although not all, publishers use distribution mechanisms to make their products available. Distributors are best described as "information intermediaries". They do not create intellectual property themselves nor do they directly publish the expression of it. Their role is to act as an intermediary between the producer (publisher) and the users of the published information. Information intermediaries may act directly between these two elements of the information chain or may themselves deliver to other information intermediaries for onward delivery to end-users. Most intermediaries can be considered as distribution and fall into a series of categories, most of which are non-exclusive. Distributors can be divided broadly into the following segments, although some interplay between the different segments is inevitable and the distinction between the different roles is becoming blurred.

- (i) Booksellers are primarily concerned with buying printed books, and sometimes journals and newspapers, in bulk and selling on to the end-user (the public). Their role is still primarily as distributors of printed material. Some booksellers act as information intermediaries to sell on to other intermediaries especially libraries. Booksellers are therefore of very limited importance in the electronic context.
- (ii) Subscription agents also act as distribution agents for publishers but also play a vital role in the economics of library management as they collect together subscriptions from many different libraries for a range of different publishers without either having to worry about the complexities of matching one to the other (Renwick 1991). Subscription agents mostly deal with other information intermediaries such as libraries rather than end-users. Increasingly subscription agents are becoming involved in direct document delivery systems. This can give subscription agents a new role as collective managers for electronic products. However, this is not popular and is a model which has not developed significantly.
- (iii) Database hosts. Just as the number of journals has increased to a point where publishers could not reasonably sell direct to their customers, so the multiplicity of databases has led over the years to the development of the database host. The host may, or may not, generate copyright material directly but is mainly concerned to provide a mechanism through which other intellectual-property creators can distribute their electronic data. Hosts usually negotiate fees and conditions between both originators and users, whether intermediaries or end-users. Although, initially, CD-ROM producers tended to distribute their own products, the rapid increase in the number of CD-ROM databases available has led to some database hosts or other distributors acting on behalf of CD-ROM producers in the same way as subscription agents.
- (iv) Libraries are information intermediaries because they collect and store large quantities of published material which they make available to their readers (end-users) in a form which enables them to exploit such materials for a wide range of purposes. Traditionally, libraries have been *passive* information intermediaries, that is, they have collected and stored information and organised it in a meaningful way but have left their end-users to exploit it as they saw fit. Increasingly, libraries are becoming *active* information intermediaries, providing detailed and analytical guides to the literature, producing information bulletins, current awareness services and proactive document delivery systems based on profiles of individuals interests and needs, through SDI (Selective Dissemination of Information) services. In the present world economic climate libraries are becoming much more commercial and are beginning to exploit their collections for financial gain rather than simply for the benefit of their readers. In addition to conventional libraries there are several organizations throughout the world which exist almost exclusively to offer document delivery services either to individuals or to other libraries. These include the British Library Document Supply Centre in the UK and INIST in Nancy (France). Other major players include the Central Medical Library in Cologne and the Technical Information Library in Hannover. These organizations specialize in document delivery using conventional library collections and the rapid increase in their business has put great pressure on the publishing industry to develop appropriate mechanisms to allow this considerable business

to continue and increase in response to worldwide demand whilst ensuring protection of publishers' and authors' rights.

In theory the provision of material in electronic form could mean the end of libraries. It is unlikely that this will not happen because users cannot have access to every source of supply and need guidance on what is the best and most appropriate source for their needs. As has happened in the case of databases there will always be a need for an intermediary although the role for that intermediary will change but not disappear. Nevertheless the role of the librarian will change from supplying information and documents to supplying packages of information. Information is big business, however it is defined. The desire, never mind the need, for information is a constant feature of current cultural patterns, particularly in the industrialized world. The information may be supplied in various ways: newspapers, journals and books, broadcasts, television, teletext or online system. Nevertheless the demand for it is there and document supply is merely one aspect of the way that demand is being satisfied. In the more sophisticated reaches of the information supply industry librarians are not simply renamed "information scientists" but transmogrified into "knowledge scientists". A knowledge scientist is not expected to provide information but to interpret it for the customer. This particular trend leads those in this situation to receive requests for appropriate data, suitably packaged, on a given topic or aspect of a topic. The resulting package may be a concoction of statistics, manipulated data, law, company information, economic projections and predictions and some documents. The knowledge scientist will be required to obtain such documents either locally or from remote sources. The customer in this situation has little interest in where or how the document was procured so long as it supplies the needs of the time. Although this is at one extreme end of the information supply spectrum, it is nevertheless symptomatic of an increasing trend in the information industry at all levels. Documents are increasingly seen as vehicles for information in its widest sense. And "information" should not be understood in too narrow a sense. The content of a well-established piece of non-factual writing (the distinction between fiction, novel and literature is an issue to be explored on another occasion!) is viewed by many as a piece of information and the format in which it is delivered is far less relevant than the delivery itself.

Therefore the role of the library in particular will be revolutionized in the electronic world but the concept of the library as "neutral" will remain. The role of the library is essentially that of a "neutral" intermediary between creators, owners and users of intellectual property. This possible role will be discussed later.

- (v) Information brokers are usually commercial enterprises which identify the information needs of individuals and institutions and attempt to meet these needs through a range of services including tailored information packages, alerting services, information services tailored to specific needs, and document delivery. Such organizations do not, as a rule, have collections of literature themselves but rely on libraries or other document suppliers for the individual items they have themselves identified for their clients (end-users). As their role is both to exploit for commercial gain and exploit materials for which they have not themselves paid any contribution to the publisher/author, this area is a primary one where management of IPRs is essential and highly beneficial to the owner.

Intermediaries have certain basic needs to fulfill their role in the information chain. These can be summarized in the electronic context as:

Information intermediaries need to be able to:

- a. Gain access to a work
- b. Store a work
- c. Retransmit a work repeatedly in different formats depending on the needs of customer
- d. Exploit additional markets to which rights owners may have no access
- e. Provide additional services which publishers are unable or unwilling to develop
- f. Protect any privileges they enjoy under national legislation to allow them to provide services to their clients. This is especially true of non-commercial libraries.

Clearly some of these conflict with the interests of the copyright owner unless they are carried out in a spirit of cooperation as discussed later. Of the items on this list (a) and (b) only are really relevant to the paper context where they are the normal part of library and information provision. Other items would need permission from the owner.

3.8.3. The user's needs

The users of information, often called "end-users" to distinguish them from intermediaries who also use information but not for their own individual needs, have requirements for which copyright management must also cater. As already stated many legislations cater for the needs of users in a limited way by recognizing that payment or permission cannot be sought in every case. Therefore something has to be done to regularize this situation. Laws which say "you shall not...." but is incapable of enforcing that prohibition is bad law. End-users are the primary reason that any document is published. Publishing broadly means making available to the public and it is the reading public to which most publishing is aimed. End-users clearly need or want published material for a range of purposes including leisure, general information for daily life, education at all levels, intellectual research and industrial or commercial exploitation.

Until a few years ago, few end-users have had direct access to large quantities of published material except through an intermediary such as a library, but with the increasing use of online publishing this pattern is changing rapidly and end-users can now obtain access to electronic databases through terminals in libraries, research departments or directly in their homes.

End-users' needs can be identified as

- a. Consult the work
- b. Store the work
- c. Be confident of the confidentiality of use activities
- d. Be assured of the origin, originality and integrity of the document supplied
- e. Ensure any privileges they enjoy under national legislation are protected

Unlike other players in the information chain, all the needs of users can be met in the paper world and, in theory at least, all of them could be under threat in the electronic world. Therefore they all need careful attention in any management exercise for electronic information.

3.8.4. Users' privileges

As explained earlier market failure leads to a situation where many countries grant users of copyright material certain privileges to use the works in certain limited way without reference to the copyright owner who has no real right to object to these exceptions to their rights. These exceptions vary from one country to another and the recent EYU Directive on copyright has done nothing to harmonize these. Each EU member state may choose from a wide range of exceptions which can be implemented nationally if they wish. Such exceptions may apply to individuals for research, private study, personal interest or use, criticism, essay writing, educational purposes or study. Institutions such as libraries or schools may also be allowed to use material in limited ways for the benefit of their readers or pupils. Similarly the organs of government such as Parliament or departments may be allowed certain exceptions and it is usual that copyright cannot inhibit either justice, democracy or national security.

3.9. Some possible solutions

The question is whether such a system is even remotely possible or whether such a system is more like a dream than reality. However it has been said that "when one man dreams, it is a dream; when several men dream the same thing it is the beginning of reality." (Cornish and Keates, 1993).

The CITED "solution"

Fortunately several men and women had the same dream and joined together to form a consortium which they called CITED (Copyright in Transmitted Electronic Documents). The group formed a consortium which applied to the European Commission under the 6th. Call for their ESPRIT II Programme under a Workpackage entitled

"Electronic Copyright" which was accepted. The partners included electronic publishers, a computer manufacturer, a library, a lawyer, security and software specialists and experts in databases and networking.

The basic philosophy of the CITED project was that, since we are dealing with information which is stored and, more particularly, processed digitally, it is therefore possible, in the digital environment, to control the processes which are an inevitable part of digital technology and, in consequence, control the copying of copyright material. In the electronic context it is immaterial what information is represented by the digital signal in any given case; what was proposed was the development of a generic model of copyright protection of digital information (the CITED model) together with corresponding guidelines and toolkit to enable the model to be implemented in specified domains. The generic nature of the CITED model means that it can be relatively easily mapped on to the legal background both as it is currently and within its foreseen developments. The generic model is also capable of being used as a standard against which different systems can be tested to ensure that they confirm to the basic requirements of a CITED protected system.

The idea behind the project was that compliance with the model CITED could be established for a range of standards, and via a number of different technical strategies. The level of protection could be defined, depending on the nature of the information to be protected, and the rights of various CITED users could be specified. These rights are specific to the users, but the effective right to gain access to a particular piece of information can be made, in practice, to depend on the protection level of that information. At the technical level the CITED model is primarily concerned with the relationship between "actions" (i.e. those actions which users may wish to undertake), called in CITED jargon "events" and "rights" (i.e., those legal rights which owners, distributors and end-users enjoy. The CITED model is concerned to capture on record the "actions" and the response to these actions can then depend on the rights which users of the appropriate information have acquired by purchase or agreement. Although the primary method of acquiring rights is to purchase these, there is no reason why a CITED facility should not permit free access if the owner so wishes. What CITED would permit is the monitoring of the free use which would in itself be a valuable piece of data. Naturally a critical area is the detection of actions which are not permitted, either generally or to a particular user. Of course, CITED could be used both as a countermeasure to such threats and as a marketing tool. Attempts at unauthorized use could then bring not just a negative response but information as to how the action which has been refused could be executed. As described, the CITED environment could be therefore dynamic and could respond to a range of possibilities as described on the Project's website at <http://www.newcastle.research.ec.org/esp-syn/text/5469.html>.

Naturally some of the technical tools used in the CITED project are adopted from the repertoire developed for the security industry. However, within the CITED project these are viewed as placing a protective guard around the copyright information in a manner which, while preventing unauthorized copying, nevertheless permits convenient access for authorized use. In fact CITED is a sort of tool kit which provides a variety of implements which may be needed in some, but not all, environments.

The CITED project was never implemented in its entirety. The original concept of designing both software and hardware that would achieve all its goals proved impossible. However, it is important from the ERMS point of view because it set out the requirements of any system for managing electronic information and identified the discrete elements which any copyright owner or user could then consider independently for implementation. Given its theoretical nature, CITED could provide the model to handle a number of the issues identified above. When the project was first proposed in 1989 it was considered too futuristic and was the object of some mirth in the information management world. It is interesting to note how many of the CITED concepts have now come to fruition in DIFFERENT mechanisms!

3.9.1. Copying from paper to paper

This is not an action relevant to CITED protection mechanisms. It is, however, still one of the most common ways in which copyright material is copied, despite the great advances in electronic technology.

CITED solution: none.

Although this is not an issue as such in electronic information management several attempts have been made to design a paper which can be used for printing but which has chemical properties that will not allow photocopying. An even more elaborate scheme was to devise a font with a minute change made in a very common word (for

example the word "the" in English which appears in nearly every sentence) and the photocopy machine or scanner would recognize this tiny change and produce an unreadable copy.

Neither of these solutions has found favour. In the first case the quality of the original material was impaired and in the latter the sophisticated technology and its installation into a large number of photocopy machines militated against the project in terms of cost when considered against (a) the volume of copying likely to be prevented and (b) the value of lost revenue to the publishers.

3.9.2. Copying from paper into electronic formats

There is a rapidly increasing requirement for libraries, archives and private individuals to be able to digitize existing paper text which can then be stored and, on occasions, transmitted as required to users of the service or to other researchers and colleagues. This requirement is not universal but long experience shows that 80% of requests to libraries can be satisfied by 20% of a repertoire of journals. Therefore the need is not to digitize all journals, or even all articles in a journal, but to be able to digitize those that are in most demand. Naturally these are the titles that generate most income for publishers and a way to meet the needs of both parties is essential.

CITED solution: Copying from paper into electronic form could not be prevented using CITED mechanisms but such copying could be done with the agreement of rights owners. This agreement would be to install CITED protected mechanisms in the digitally-stored text to carry out CITED monitored activities such as further copying and distribution. Given the huge increase in digitization programmes in many parts of the world this issue is a serious one that needs addressing. Unfortunately many publishers and owners of rights are nervous about giving the initial permission in case the subsequent technology fails to manage and protect their interests adequately. Many digitization programmes are therefore limited to older material that is out of copyright or material where the rights are owned by the institution doing the digitization such as unpublished archival material or internal papers and reports. This material is often in low demand and the economics of digitization are against taking the programme forward. Projects such as JSTOR of which more details can be found on the web at <http://uk.jstor.org/about/need.html> which aims to digitize scholarly journals are limited to non-current journal issues which have lost much of their economic benefit to the publishers.

3.9.3. Copying from electronic formats onto paper

This is a requirement for many all users of electronic information of all kinds and includes most libraries and other information intermediaries, as well as individual researchers. Although the temptation is always to think of online supply, the use of CD-ROM and electronically-based text frequently generates requirements for paper copies which can be used in many different environments. Although this can be done already under licence within an institution there are growing problems where documents are requested from a distance and the requester is unaware that the document required is in electronic form. This problem is compounded when documents are published in both paper and electronic form which could lead to the anomaly that a paper copy could be made from another paper copy but not from the identical electronic text.

CITED solution: Copying from electronic format onto paper can be controlled through software already but this procedure needs to be capable of control, charging and monitoring depending on the requirements of the copyright owner and the end-user's status. This is a primary example of how CITED protected text can achieve these goals. CITED mechanisms enable individual users or institutions such as libraries to copy onto paper in return for appropriate royalties. By requiring the user to have "bought in" to the system in advance the CITED model set the scene for many contemporary systems that enable different rates to be charged to different users. Also the same user can be charged different amounts for copying different articles. At the same time it is possible to permit copying by one group of users for low or no cost (students, for example) whilst charging a higher rate for the same activity to researchers in commercial institutions.

3.9.4. Downloading from one electronic format to another

As more and more documents are available in electronic form, or only in electronic form, copyright owners and document suppliers will be able to deliver to end-users only by using the electronic forms available. Although copying from electronic formats onto paper is already controlled and well used, there is inevitably a need to be able to download into the user's own system.

CITED solution: Documents protected using the CITED model can have the facility to download or not built into their protection mechanism to permit copying in the same way as copying onto paper (already described). However, the model did not offer protection against further copying and distribution once the work has been downloaded.

These facilities were further developed in projects such as COPICAT and the highly sophisticated model described in Project IMPRIMATUR (Cornish 2000).

3.9.5. Meeting the needs of the information supply industry

The information supply industry is one which is growing in both size and complexity. The roles of different players are becoming less and less clear. Nevertheless the basic requirements described earlier remain the same. The CITED model offered the possibility of easy access, flexibility, comprehensive data and recompense for the owners of the many different rights involved in its operation. Although collection of royalties and data can be achieved through this system, it is desirable that such collection should not be done by each rights owner separately but could be achieved through a central agency similar to a Reproduction Rights Organization (RRO). It is still hoped that there may be ways to establish a Trusted Third Party (TTP) which would oversee and manage such elements of the system as lend themselves to centralization. There are still many areas of this model and its application to develop and the management of the concept is itself one of these.

3.10. Other applications

Clearly CITED is capable of being applied to many different areas of information work. It can be applied in any digital environment such as sound recordings, broadcasts and eventually digital video. A demonstrator for the model was produced for sound recordings protection and complements that already developed for document delivery. The concept behind the model can be further developed so there should be even more opportunities to map this application onto different media and solve other problems.

3.10.1. Taking the concepts of CITED forward

From the CITED model other trials and research has grown until there are a whole host of models, hardware and software based on the concepts first explored by the CITED consortium (Cornish and Keates 1993).

3.10.1.1. The virtual workspace concept

This issue was explored by the COPICAT project which addressed the area of electronic copyright protection by aiming to provide a basis for confidence in electronic copyright protection and open up a "blocked" market in multi-media electronic publishing.

COPICAT tried to develop a generic architectural model for an electronic copyright protection system incorporating the copyright-related event management model from the CITED project (ESPRIT 5469). It extended this by adding a security model appropriate to the application domain. Selected components from the EAST project (DELTA D2016) were to be used to create an educational copyright protection model. Selected multi-media educational material formed the basis for an example of material requiring copyright protection. The educational domain was chosen because the project consortium considered that this represented a "worst case" area in which most if not all copyright protection issues arise. Most other domains appeared to provide less stringent boundary conditions.

A complex ownership and access structure was simulated. The COPICAT system was installed and tested on a pilot site (University College Dublin).

A validation workpackage provided independent assurance of the effectiveness and correctness of specified aspects of the 6 key workpackages and delivered validation reports on a number of key deliverables. A novel feature of the validation was to subject the model to controlled and audited hostile attack by IT-experienced students.

The final security validation and verification report established that the technology developed in the project conferred an acceptable protection of rights and also that it was seen to do so by copyright owners.

COPICAT was important because it developed, but was unable to exploit, technology using the concept of the "virtual workspace" as described on the Project website at <http://www.newcastle.research.ec.org/esp-syn/text/8195.html>. In simple terms COPICAT developed a system whereby a work could be accessed and downloaded by any authorized person. They could then use the work for educational or research purposes so that it could be changed, or have information added or deleted. These actions are central to the "moral" rights referred to earlier. There was no question of economic benefit either to the owner or the user but only the facility to use the work as a basis for further development, study or experimentation. These actions were carried out in a virtual workspace which meant that. However, when the user tried to save the work this could not be done and the file simply disappeared. This model thus protected the integrity of the work and also prevented it being manipulated and changed and then subsequently re-issued as a different work by someone else. For a major electronic project to recognize the importance of moral rights and develop a system to protect them was a major breakthrough.

Other attempts to develop methods whereby a work could be accessed by tutor and student and subsequently changed failed largely because the technology used was too cumbersome and relied on telecommunications techniques rather than computer technology. An example of this is Project MURIEL (Website at <http://www.cordis.lu/libraries/en/projects/muriel.html>).

3.10.1.2. Trusted Third Parties (TTPs)

One of the great challenges for any electronic copyright management system is the collection of royalties. Fairly sophisticated technology now exists to control access, downloading, printing, changing text and obtaining data on how a product is used. The real issue for owners and users alike is how to pay for the use to which a work is put. There are a series of issues which need to be addressed in dealing with this complex and sensitive issue. Where a system is dealing with only one owner, or agent acting on behalf of a number of owners, then the issue is simply how to charge if charges are to be made. As discussed in another chapter, there are various models such as blanket licences, pay-per-view, pay-per-use, payment by end-user, payment by parent institution, site licences, etc., etc. These can be arranged between the institution desiring access and the owner. The real problem comes when access to multiple works owned by multiple owners is necessary. It may be possible technically to allow access to a whole range of electronic materials through the same PC. This requires the use to switch from one supplier to another, using different ID and probably enjoying different access rights with each one. This is tiresome and irritating. Most researchers are unaware and uninterested in exactly which publisher or owner produces which piece of information provided it has the right academic or scientific status in terms of being refereed or guaranteed as to quality by the issuing institution. What most researchers want, and this is just as true of the advanced scientist as it is of the local historian working in the public library, is access to a wide range of materials with the minimum of protocols to observe. In the paper context users search for articles or reports with scant attention being paid to the publisher or originator and researchers will pass from one title to another without any such thought. This needs to be reflected in the electronic world as well. However, this raises major problems about how to pay the owner. What is needed is a system that will log use with all the necessary data, recover the royalties from the user (whether directly or via a billing system) and give the owner data on how the material has been used. Because there is no intermediary between user and owner and one use may need to relate to a number of owners the system breaks down unless some kind of "middle-man" is introduced rather like a warehouse in the commercial marketing chain. One role of such an intermediary is to collect data on the use of the material in question. This issue was tackled, amongst others by Project ERCOMS (Electronic Reserves Copyright Management Systems) a UK project which was led by De Montfort University in Milton Keynes. Details of the project can be found at <http://www.ielr.dmu.ac.uk/Projects/ERCOMS/>. The project identified that copyright monitoring and publisher feedback is a very important aspect of electronic library/reserve development. Under the various licensing schemes for networked texts, whether it be a fixed price licensing model, or usage-based or a combination of both, libraries and universities with networked systems have to demonstrate that they can control access and meter usage. The project managers realized that a generic electronic copyright management system which has built-in copyright management capabilities was thus urgently needed. De Montfort University aimed to develop such a system capable of working with various electronic reserve management systems, and able to provide full tracking of usage accountability and automatic counts of the occurrence of copyright events.

De Montfort University developed ERCOMS by building on the copyright and usage tracking experiences of other related library projects. The system was to be a complete package containing existing software and

newly developed programs implemented on the server platform. Managers of electronic reserve systems would be able to feed in their rules on copyright management into the ERCOMS system, which would also provide an Application Programming Interface (API), a collection of programs to provide the linkage to the electronic materials for collecting the raw data. The data would serve to provide feedback to publishers on the use of their documents as well as providing evaluation data for project purpose. and The Open University Library.

The benefits of ERCOMS would include:

- a generic system which could be applied in other higher education institutions to any reserve system requiring copyright management functions;
- Reduced development time for setting up a copyright management system. ERCOMS would have all the major built-in functionality for copyright management. Reserve managers requiring copyright management facilities would not need to build a new system from scratch, but just feed their requirements into the system;
- A PC-based automated rights clearance system for handling electronic permission requests, generating chasers and user agreements.

Although using university reserve collections as the testbed for the system the application is capable of being mapped onto any similar situation where use data is required by a group of owners.

Unfortunately they once again designed a sensible model but was not implemented for economic and political reasons.

However, the struggle to find a solution to the Trusted Third Party problem persisted and was tackled in a different way, using a technology which is now regarded as commonplace but which, even five years ago, was still regarded with suspicion by many commercial factions – the Smartcard.

It was realized that the Smartcard, which can be used for so many applications today from personal data to paying for bus fares and gaining access to the local swimming pool, was likely to be a vehicle by which some of these problems could be solved. Building on the CITED experience, a team of researchers began to develop the idea of a smartcard to give access to electronic information and at the same time monitoring use and providing a mechanism for recording payments due. This led to project COPYSMART, The CopySmart project aimed to develop an industrial low-cost solution for implementing Intellectual Property Rights (IPR) management based on the CITED model.

COYSMART is interesting because it was originally driven by the media industry rather than the academic or research community. The Project recognized that the fast expansion of information networks like Internet and the introduction of digital broadcasting technology has given rise to the problem of media copyright, author rights, access control and payment for digital multimedia material. As already stated, once such material is published it is difficult to control the use, manipulation and distribution of digital information and to guarantee related rights. The project team realized that these issues need to be addressed for the development of the information society, for the creation of business and services on open networks and for the protection of the European cultural heritage. Thus it was driven by both commercial and non-commercial motives.

Although developed several years ago, the PC environment was then, as now, the one with the most urgent needs. The project began by looking at the fact that millions of PC users are connected to network servers and used, and to some extent still do use, removable storage media, such as CD-ROMs for leisure and business. Access to information on networks is mainly limited to free-ware or share-ware, because payment schemes are difficult to implement, copyright and author right protection even more. However, COPYSMART acknowledged that basic technology existed with:

- The CITED a global IPR management model previously described
- technology from the Smart Card market, and
- standard interfaces for portable hardware, the PCMCIA.

CopySmart targeted the PC environment and provided within short term the hardware and software building blocks for implementing IPR management in multimedia applications. Respect of standards was a key issue for large market acceptance. This issue of market acceptance is probably the biggest single barrier to developing a comprehensive ERMS that can be identified. The principle adopted was thus to not secure the PC, but the application and to provide hardware security by a standard PCMCIA (Personal Computer Memory Card International Association) device. This CopySmart device would contain protected CITED functions and security functions. Cryptographic algorithms and payment functions would reside in the CopySmart device in a removable security module, rather than in the PC itself, so that it can easily be adapted to national regulations and payment methods.

It was foreseen that an even larger and more demanding market than traditional publishing would be found in the TV environment with digital and interactive TV applications, but the issue of standardization had still to be addressed. The flexibility of the CITED architecture on which CopySmart relied and the respect of standard interfaces such as PCMCIA would allow re-use of CITED basic components for TV-centered applications in the future.

All the hardware and software developments were optimized for low cost implementation to facilitate dissemination and market acceptance. Wide dissemination was also to be encouraged by provision of development tools for integrators of IPR managed applications in the PC/Windows environment based on CopySmart building blocks. The project is described in more detail at the website <http://www.newcastle.research.ec.org/esp-syn/text/20517.html>.

CopySmart made strides in solving the basic problem of the TTP and distribution of royalties in return for use. Users obtain a CopySmart card which they then "charge" with the desired number of units. This can be done centrally or via the user's own institution such as a library. The user then uses the card to access electronic information and is debited as the use progresses according to the rates set by the rights owner. The usage is recorded and the revenue collected from charging the card is then distributed in proportion to the use made of different components of the electronic material accessed. The scheme is still in an embryonic state but the technology and concept are now both firmly established. What is needed is a critical mass of published material and owners so that installation and use of the system becomes worthwhile for the user and the institution. There is also a need for proper structures for collecting and distributing royalties in the same way as the traditional collecting societies.

One application for CopySmart so far has been in obtaining access to electronic materials for visually impaired persons. The software and hardware developed by Project SEDODEL creates, verifies, and demonstrates a secure document delivery service, which will meet the information needs of blind and partially sighted people, and guarantee the rights and obligations of actors in the publishing chain. It achieves this by integrating two key technologies: Electronic Rights Management Systems (ERMS) and accessible electronic documents. SEDODEL gives publishers the confidence to distribute electronic copies of their publications to organizations of and for the blind and partially sighted, and to blind and partially sighted people directly.

SEDODEL uses the CopySmart ECMS. CopySmart's end user software is implemented on a standard Windows PC with a smart card reader. Individual users have their own smart cards, which contain identification and authentication of the user together with the use rights granted by the service provider. A further EU-funded project under the Tide Programme, project SATURN has designed a set of smart card data structures for disabled and elderly people, which have been incorporated into a European standard.

The information is accessed by the end user on a CopySmart enabled PC running Windows. The end user's access rights are encoded on a personal smart card, which the application reads and interprets. The application unwraps the information and allows the user to access the information only in accordance with the specific user rights. The information will be accessed by a Document Reader, which will enable visually impaired users to read the information using their own access technology, such as screen readers, Braille displays and large print systems. Use of the information will be monitored by CopySmart, which deals with access control, clearing of rights, traceability, audit files, proofs of usage and handling of payments.

CopySmart achieved the implementation and operation of a secure document delivery service for blind and partially sighted people, the extension of CopySmart to the needs of blind and partially sighted people, and

influenced changes in European copyright legislation. The secure service give publishers the confidence to release to organizations of and for the blind and partially sighted (and to blind and partially sighted people directly) electronic copies of their publications, thereby greatly enhancing access to information. Further information on CopySmart and its technical applications are described at <http://www.snv.jussieu.fr/inova/ntevh/secure.htm>.

3.11. No "all-in-one" solution

It is clear that no one model solves all the issues facing the problems of making information available in electronic form.

Integrity was an issue tackled partly by COPICAT in that it provided the virtual workspace in which material could be used (or even abused!) without the original work being altered or the author's interests harmed because the subsequent text could not be saved for future use.

Payment for use was tackled by CopySmart with some success using smartcard technology. This has subsequently found a real development programme with Project SEDODEL. But neither CopySmart nor COPICAT could handle **both** issues and there would need to be a conflation of the two projects and their hardware/software to achieve a solution which covered more than one issue.

3.11.1. Copying, re-use and re-transmission

None of these projects in themselves even attempted to solve the crucial issue of preventing downloading, re-transmission and subsequent use by unauthorized users. Many systems have been tried but none have so far proved totally effective. Whilst copying is an irritant, provided that it takes place either on to paper or even into a stand-alone PC it is rarely more than that except in the "pop" music industry where it seriously undermines sales which are primarily direct to individuals. This is why the recent controversy over MP3 and Napster (Napster 2001) has been so furiously fought. However, in the scientific information world, there are two problems: downloading and retransmission. These can be considered either in terms of prevention or identification of unauthorized copies. In the first instance a technical mechanism has to be put in place that will prevent anyone downloading or re-transmitting an electronic document unless they have permission to do so. Such permission could be in terms of a licence or other permission from the owner direct or through some kind of permission given to an intermediary such as a library. The second option, identifying "copies" made and re-transmitted has the advantage that it is technically possible but can only be enforced after the event and therefore will often fail to find infringing copies or unlawful use except by accident or very complex tracking mechanisms. What is essential is that there is a consensus between owners, creators and users as to what is needed, what is desirable and what is possible in both technical and legal terms. Such a consensus was the aim of Project IMPRIMATUR.

3.11.2. Exceptions for users

Although this may seem a minor issue, the ability of individuals to access information without being inhibited either by technology or economics is an essential element in the information flow which is vital to human development, education, economic growth, scientific research and democracy and justice. The crucial question is how to manage the se exceptions electronically. In a paper world there is nothing to stop occasional copying by individuals anyway but once material is digital then the opposite situation applies and the copyright owner can easily put in place mechanisms which can prevent totally any access unless the pre-conditions set down by that owner are met in full. The technology therefore is in danger of working against the needs of the individual and benefiting only the owners of copyright material. The unsolved challenge is how to design a protection mechanism that will nevertheless allow certain amounts of use which are considered reasonable within the law without either reference to the owners or the need for payment. This was perhaps the greatest single matter for debate when the EU Directive on copyright was passing through its various stages. At one point the exceptions in favour of individual users were being ignored because it was felt that the electronic environment provided for total management. But pressure groups such as libraries (for example the European Bureau of Library, Information and Documentation Associations (EBLIDA)), as

demonstrated on their website www.eblida.org eventually succeeded in inserting protection for users through Article 6(4) which states:

Notwithstanding the legal protection provided for in Paragraph 1, in the absence of voluntary measures taken by rightsholders,Member States shall take appropriate measures to ensure the rightsholders make available to the beneficiary of an exception or limitation provided for in national law the means of benefiting from the exception or limitation...where the beneficiary has legal access to the protected work or subject-matter concerned.

What has not yet been resolved is just how such exceptions can be managed. Is it possible to tell an electronic management system that one act of downloading is allowed by law but exactly the same action, undertaken for a different purpose, is not and should be controlled by the owner or paid for by the user. There are many issues which will take a long time to resolve. Rightsowners tend to say that they are reasonable and will allow many of the actions permitted by law anyway but even then it is hard to see how they can be distinguished one from the other. Users fear that, whilst rightsowners may intend to be reasonable and cooperative now they may not be so in the future. The installation of mechanisms that control, even if no fee is sought, are seen as the beginning of control of legal exceptions by owners and therefore this model is being fiercely resisted by user groups.

4. Developing a consensus

As has already been demonstrated, the whole area of electronic rights management is one of considerable potential conflict between creators, distributors (whether publishers, database hosts, website providers) library and information professionals and end-users.

Being aware of these potential conflicts the European Commission funded a major project - IMPRIMATUR (Intellectual Multimedia Property Rights Model And Terminology For Universal reference) - to try to build this consensus amongst the major players in the EU, Japan, Australia and North America. Essentially IMPRIMATUR was considered a "horizontal" project, in other words it worked across a number of disciplines and areas rather than within any particular one. The fact that the subject of copyright management crosses more than one topic and discipline boundaries has already been demonstrated in this paper. As well as the more obvious players it also is crucial to bring together writers, photographers, composers, artists, film makers, record makers, recording artists, performers, lawyers, software and hardware manufacturers, Internet providers, librarians, users and financial specialists. Copyright knows no subject barriers any more than the human mind does. Because copyright is essentially a commercial product with a market value. Project IMPRIMATUR worked in the context of electronic commerce and not just another forum for agreeing how to manage copyright. For this reason the consortium which originally ran IMPRIMATUR consisted of quite a large number of partners representing many of these aspects of the information industry. It included a national society representing authors rights and the international organization representing authors and composers collecting societies, technical expertise, electronic banking specialists, academics, users and intermediaries, the entertainment industry and legal experts. The idea was to build a consensus on what should be managed and how without stipulating the technical mechanisms which would be seen as antitrust (in the US) and anti competitive.

The consensus processes provided a framework for technological development as it provided a commercial and legal context for this development. The aim of the technical development was to integrate, demonstrate and validate the key features of an Electronic Right Management System.

By developing a prototype technology the Project tried to move forward the debate by offering practical solutions to real copyright management problems. The hardware and software developed by IMPRIMATUR was tried out major photographic archive in the University of Florence where an image can be sought and found, identified for potential use, requested online with the purposes defined and the image received with the necessary watermarking and payment records. This can be achieved in a matter of two or three minutes. The technology has also been used successfully protecting sound files. The technology can be used to adapt and develop the technology to meet specific media providers of all kinds as well as end-user requirements. The watermarking technology developed by IMPRIMATUR is transparent to the user but is also permanent and therefore enables owners to identify and trace infringing copies.

All this is very exciting and challenging but needs to be set in the context of the whole range of interested parties. The project took great trouble to hold meetings of Special Interest Groups (SIGs) in areas of interest

(sound recording industry, libraries, electronic commerce) These were supplemented by major consensus for a general publicity and the establishment of official contacts and networks.

One example of working together rather than in a vacuum is the question of identifiers. Although electronic technology can do many things, it requires the facility to identify the things to be managed. One initiative, the Digital Object Identifier (DOI) comes from America. This is a unique and persistent identifier to mark digital objects in a global electronic environment. It is managed by a directory to link users to a specific content whose ownership is recorded centrally. However, ownership is only one half of the problem. Having gained access to a work and knowing who owns it, what can the user do with it and under what circumstances. There is also the question of a multiplicity of rights in one work, especially one which contains sound, moving images and text as well as photographs and graphic works. To cope with these complex issues the International Confederation of Authors and Composers Societies (CISAC) developed an identification system which includes a wide range of works which can be tagged to give all creators and parties with an interest in the work as well as licensing conditions. Once matched with DOI this could provide a world-wide access and rights management database.

No project has all the solutions because nobody is quite sure of all the questions. Technically it is possible to build an "all-singing, all-dancing" electronic rights management system but the question has to be asked whether it is really needed. There are serious issues as to whether such a system could ever be economical or realistic. There are serious questions from a scientific point of view as to whether it might threaten the information flow on which everyone is all dependent for professional existence. In the academic and text area it may well prove too expensive to build and maintain such systems. In the multi-billion dollar entertainment industry the argument is quite different. Once a feature film, such as *Harry Potter* becomes available in digital form the potential for infringement in a massive scale gives a real reason for building such systems. At the same time it gives the owner immense potential for exploiting a work in this form. Different elements of the film can be digitally tagged and use and access to them managed accordingly.

But once the technology has been developed, as in all other cases, the cost will diminish and implementation may become quite easy. On the other hand, managing the rights which the technology gives may continue to be too costly and burdensome to make it worthwhile. The economics of protection has not yet become sufficiently stable to be able to determine the future. As one protection device succeeds another, other issues now arise. For example, CD manufacturers have devised blocking technology to prevent their products being played on PCs. Or, indeed, making them unplayable in this situation. Purchasers of the CDs have taken this issue to court as it infringes their rights under consumer protection legislation in some countries.

For example it was reported that Universal, the world's biggest record company, was to release more copy-proof CDs after music sales declined for the second year running. They were down by 5% in 2001. One problem is the availability of CD rewriters which have enabled music listeners to copy CDs cheaply and easily. IFPI (International Federation of the Phonographic Industry) members closed down 1,000 illicit music internet sites last year but there are still many remaining (IFPI 2002).

The development of consensus building is continuing through the company set up as a result of IMPRIMATUR called Rightscom. In their own words from the website www.rightscom.com the organization itself says:

In the digital community, no company or organization can work in isolation from the wider environment. Conformance to international standards is just one area where building industry-wide consensus has become a prerequisite. Just as important is obtaining "buy-in" within large organizations. For sustained development in the digital world, consensus building is now an essential management task. Two aspects of the digital market make consensus building both complex and challenging. The interdependency of the issues which cross traditional organizational borders can rapidly lead to confusion. Secondly, stakeholders themselves possess varying levels of knowledge, and often have widely divergent and conflicting expectations. Rightscom has both the expertise and the sensitivity needed to seek out solutions on which all stakeholders can agree, promoting positive and constructive outcomes for projects. Rightscom's work in consensus building initiatives has led to the development of a unique and extremely effective methodology.

4. Conclusion

Clearly there is much still to be done. No system has found the complete answer to the problems of promoting, yet protecting information in electronic form. Economics, politics, legal issues and consumer resistance may in the end determine how these issues are resolved. Access, integrity, paternity, printing, downloading and royalty payments can all be managed. Distribution of royalties is causing difficulties still and nobody has yet produced a solution for managing the exceptions to copyright in favour of users. The future is certainly challenging as both law and technology develop. Similarly, as users become more aware of the possibilities of information delivery their expectations will change and fundamentally alter attitudes to intellectual property in a world where every user may well become an owner.

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