The profound impact of digital technologies on all aspects of the society, has triggered a new phase of the world economy. To keep pace with technology, the intellectual property rights community has been reviewing the existing norms and rights of the international rights regime and create new ones to cope with the creation, adaption, transmission and distribution of works, taking into account the distinctive qualities of the digital medium. It is hoped that the new yet evolving regime strikes a balance between the rightholders and the public, and also facilitates future development of technologies and markets. This article addresses the implications of the new WIPO copyright treaties, the unresolved IPR issues, and issues which may crop up in the future in the context of emerging digital technologies and Global Information Infrastructure (GII).

Intellectual property is an area of the law that evolves with the development of technology. The emerging digital technology, with the increasing use of computers and communication technology and their merger into an integrated Information Technology, has given rise to Digital Economy. The new economy is changing the way the products are created, the nature of products themselves and how they are distributed.

Certain distinctive qualities of the digital medium coupled with the setting up of National Information Infrastructure (NII) in different countries and emerging GII, have given rise to challenging legal issues over the past few years and many more can be expected in the future. In the context of globalisation, IPR has come to be recognised as an important tool for economic dominance. Most of the developed countries consider IPR as an instrument to remain as technology and economic leaders. Intellectual property organizations and national governments are in the process to bring about significant

changes in the doctrines of IPR systems. But again in the present scenario, where global information super-highways are emerging with associated applications, the users of technologies, specially in the developing countries, may prefer a wider-use permissible harmonized approach to ensure the development of a free and open global electronic market place, without any territorial restriction. Therefore, it is necessary to develop an IPR regime, where the nation’s economic interests with its comparative advantages in the competitive world are protected.

In this study, we attempt to analyse the emerging digital IPR regime, specially with respect to copyright protection, as it appears that copyright will be the form of IP most involved in the development of digitised information systems in the new world. We start with reviewing the evolution of traditional IPR laws and the associated concepts. Next we move on to analyse the impact of emerging digital technologies, followed by the nature and scope new international IPR treaties being attempted to respond to the changes. Then the report briefly highlights the need and evolution of systems for electronic management of rights. Finally we talk about the all important issue of Internet and copyright, and the unresolved issues surrounding Internet and emerging new applications.

Evolution of Traditional IPR Laws

Copyrights, basically originated with the printing press. The rights granted under copyright have also been matched to the type of creative work involved, the medium of work, and the realities of market economics. Paper products, embodying intellectual works, the rights of reproduction, distribution and modification (derivative works) were born. To protect music, theatre and art performance and display rights were added. When sound was placed on tangible media and broadcast over the radio waves, the IPR laws were expanded to include the affected rights. When computer programs were recognised as protectable expression, modification to the traditional rights followed. Many of the concepts associated with the existing rights were originally evolved under conditions and assumptions not easily transferable from paper-based society to a digital world. The copyright regime offered some exceptions with respect to exclusive rights of a copyright owner—fair use, first sale doctrine and library exemptions. Fair use allows a user, when he/she incorporates some of a pre-existing work into a new work of authorship. Fair use of a copyrighted work, including reproduction in copies or phonorecords for purposes such as criticism, comment, news reporting, teaching or research is not an infringement of copyright, with original source duly acknowledged. The ‘first sale doctrine’ prevents an owner of copyright in a work from controlling subsequent transfers of copies of that work.

Characteristics of Digital Media

Replication

The ease with which works in digital form can be replicated poses a difficult problem for the law to handle. In the existing copyright regime, there is a general perception that making copies for personal or private use is considered fair-use and lawful. While the technology of reprography has improved dramatically, in digital domain, ‘perfect’ multiple copies can be generated by the same technology which is employed for the use of the digital product. Hence it has become more difficult for the copyright owners
to exercise control over replication of their works and to obtain compensation for unauthorised replication. Although the copyright system in the print world has generally focussed on sales of copies of copyrighted works, in the digital world the trend may be to reap the financial rewards for creating and disseminating intellectual products by charging for access to and use of digital works and limiting rights to use and copy these products.

**Ease of Transmission, Compactness and Multiple Use**

A second characteristic of digital media that poses problems for traditional IPR systems is the ease with which digital works can be transmitted and used by multiple users, compared to paper versions of the works. A pirated version of a digital work can be loaded into a computer connected on a new-towrk of computers or a large computer system with multiple user network, each of whom can have ready and virtually simultaneous use of the same copy. Compactness is another characteristic of digital media which has potential to create new kinds of legal problems. In comparison to print and other traditional media, digital works do not take up much space and hence such works are inherently easier to steal. While the compactness of digital media makes it possible to put company records, whole libraries, encyclopaedias and the like, in a set of compact discs, some new kinds of intellectual property law problems are bound to result from these new assemblages of materials, which were unheard of in print world. This has led to development of elaborate systems with access restrictions and regulations, which in turn, has thrown up issues of who should regulate, types of rights to be controlled and kinds of access to information sources.

**Fixation of Digital Works**

Works in digital form are amenable to easy and quick modifications by the users. Through digital sampling techniques, sound recordings can be mixed and combined with other to produce a new sound recording, different from the original works. Photographs and video recordings in digital form can be manipulated to add, delete and combine elements from different works. Computer programs can, by being processed through sophisticated re engineering tools, be transmuted into unrecognizable forms. The user can, thus, customize the copyrighted works and sell them as new works. Under the 'first sale rule' of traditional copyright rule, owners of copies of protected works have the personal property rights, which authorises them to exercise control over the derivative work. But now law makers are forced to amend the copyright statute to provide some authority for exercising control over what users can do to transform the copies they might have of a copyrighted work in digital form.

**Multimedia Works**

Works from different categories are fixed in a single tangible medium of expression increasingly. This will certainly be true as the development of the NII/GII progresses and the ability to create and disseminate interactive multimedia or mixed media products increases. The very promise of multimedia work is that it combines several different elements or types of works (text, sound, still images and moving images into a single medium). Works protected by copyright are going to become less and less differentiated by type and more and more equivalent to one another because they will now be in the same medium. This equivalence of works in
digital form will make it increasingly easy to create a difficult-to-classify work by combining what have previously been thought of as separate categories of works for copyright purposes. This has given rise to the consideration of forming a separate category under the present copyright laws in the future or it may even lead to eliminating categorisation.

**Patent or Copyright**

Of even greater importance are the consequences of the blurring of what was once a firm distinction between data and writings on one hand and machines on the other. Computer programs have made the distinction between writings and machines, and data and machines more difficult to draw. Because of the mechanised character of computer programs, patents are now issued for methods of representing, organising and manipulating data in computer programs. One of the most profound consequences of this development is the new entry of patents into an arena in which copyright was once the sole form of intellectual property protection. If a patent is issued on a method of organising data in a database, does a copyright in the database also cover this method as a structural abstraction of the database program? If such questions are resolved, the resolution may change the face of intellectual property law, for the overlap of patent law and copyright law is a new phenomenon.

**International Treaties on Copyright in Pre-Digital Era**

The World Intellectual Property Organization (WIPO) is responsible for the administration of, and activities concerning revisions to, the international intellectual property treaties. The principal WIPO copyright conventions include the Berne Convention for the Protection of Literary and Artistic works (1971), the International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (Rome Convention, 1961) and the Geneva Convention for the Protection of Producers of Phonograms against the Unauthorized Reproduction of their Phonograms. Also, UNESCO and WIPO jointly administer the Universal Copyright Convention (UCC, 1971) which is a lower level copyright convention that was negotiated in the years following World War II largely to bring the United States into the world of international copyright. All the members of the UCC are also members of the Berne Convention.

The Berne Convention is the principal international copyright convention and is the largest and most detailed. While it is generally regarded as providing adequate international standards of protection there is a belief that it should be updated on account of advances in electronic communication and information processing technology. Despite its level of detail, and because it must accommodate differing legal traditions in some areas, its standard in the present form may be inadequate to deal with the world of digital dissemination of copyrighted works. The Rome Convention Treaty provides for the protection of producer of phonograms against unauthorized reproduction of their phonograms, for performers to prevent certain reproductions and fixation of their performances and it provides limited rights for broadcasting organizations. It also provides for protection against certain 'secondary uses' of phonograms.

In addition to the traditional WIPO forum, other international bodies have a significant role in intellectual property policy formulation. The Trade-Related Aspects of Intellectual Property Agreement (TRIPS) under the
Uruguay round of trade negotiations in the General Agreement on Tariffs and Trade (GATT) sets significant standards for the protection of copyright and related rights. And most importantly, it contains provisions to ensure that parties to the TRIPS Agreement fully implement its obligations.

The New Copyright Treaties (WIPO)

Recognising the profound impact of the digital technologies, as mentioned in the preceding paragraphs, WIPO organized a Diplomatic conference in December 1996, inviting around 160 member countries, with digital agenda as the main theme. The digital agenda of the conference sought to modify the existing norms and rights of the international rights regime and to create new ones so as to cope up with the creation, adoption, transmission and distribution of works in the digital medium. Three draft treaties, prepared by WIPO were discussed in detail—one concerning copyright, second concerning the protection of performers and producers of phonograms, and the third one concerning new form of sui generis protection of databases. At the end of the conference the first two treaties were adopted, viz: the Copyright Treaty and the Performances and Phonograms Treaty. These treaties would come into force after ratification by the respective member countries.

Contents of the Treaties

The WIPO Copyright Treaty compliments the Berne Convention Treaty. With respect to computer software, in the new treaty, computer programs, in any mode or form of expression are protected as literary works. In the case of copyright protection of original databases to emphasize the unique and specific nature of databases as objects of protection, compared to traditional categories of works, database has been defined as compilation of data, instead collection, as defined in the Berne Convention.

Perhaps the most important article of the new treaty is concerning the rights of communication to the public. The provisions of the Berne Convention do not provide full certainty when they are applied to the interactive on-demand transmission of protected works over information networks. The new right of transmission has been added to the already existing rights of reproduction and the right of public performance or the right of communication. The right of communication in the new treaty has been extended to all categories of copyrighted works. The actual wording of the corresponding Article, regarding the right of communication is that such a right includes 'the making available to the public of their works by wire or wireless means, in such a way that members of the public may access these works from a place and at a time individually chosen by them'. This statement takes care of digital on-line delivery of works and this rule would function as the basic rule for digital department stores, digital bookstores, digital record and video shops. Providing access to protected works is covered by authors' rights. Contracting parties or member countries of the Treaty can fulfil the requirements by granting authors a right of communication, 'a right of transmission' or a right of distribution by transmission. Legal security for on-line service providers and telecommunication companies is assured, by the clause, 'The mere provision of physical facilities for enabling or making a communication does not itself amount to communication within the meaning of this treaty or Berne Convention'.
The second treaty on performances and phonograms is intended to be an independent and comprehensive one, covering all the relevant aspects in respect of the protection of the performers and producers of the phonograms. This treaty contains an important article on definitions, to keep pace with the digital influence. The definition of the phonograms and producers of phonograms have been modernised so that in addition to the fixation of sounds, they also cover fixation of a representation of sounds. In many cases the whole or part of a phonogram is produced without fixing 'real' audible sounds, but by writing the digital signals, representing sounds directly into memory of a computer. The definition of broadcasting now explicitly covers transmission by satellite and transmission of encrypted signals. In order to protect the performers against unauthorised and obscenest modification of their performances, while fixing in phonograms, performers have been granted 'moral rights'. Similarly, performers and makers of phonograms are granted right of reproduction, both direct and indirect in any manner or form, and an exclusive right of making available to the public of their performances fixed in phonograms by interactive on-demand delivery methods.

In both the treaties, some common provisions have been introduced — international exhaustion of the right of distribution which permits further distribution of legal authorised copies of protected works anywhere in the world, right of rental for computer programs, cinematographic works and works in phonograms. With regard to limitations and exceptions, member countries have been authorised to modify or extend their national legislation to include appropriate limitations and exceptions, for digital network environment.

Intellectual Property in respect of Databases

The third treaty which was tabled at the WIPO conference for discussion and adoption but got deferred, is a new instrument for protection of databases called 'sui generis protection'. The proposed sui generis protection is intended to be extended to any database if the collection, verification or other steps in its production are the subject of substantial investment in the form of human or financial resources. The idea behind this proposal is that the databases are a vital element of a global information infrastructure, and it is important to encourage further development of databases and there is a need to strike a balance between the interests of the producers of databases in protection from unfair copying and the interests of users in having appropriate access to the benefits of a global information infrastructure. The clear target of this form of protection is commercial activity. Rights granted under this treaty would be in addition to any copyright protection already available.

The scientific communities, governmental and other institutions handling large volumes of data, had adopted a critical view of draft treaty in the present form. The feeling was that the protection would break the principle of full and open exchange of scientific and other data between scientific institutions. In reality, no form of protection precludes the compilers of databases from exchanging their data. The proposed protection provided the possibility of making a database available against payment of a fee. Also the regional groups of developing countries were not prepared for any negotiation on this matter at that stage (December
Hence it was felt that the time was not ripe to introduce a new form of protection for databases. Of course, this does not mean that databases are not protected presently. If they meet the requirements for protection; copyright is granted for databases under the new copyright treaty as well as Berne Convention. Protection does not extend to actual data or material in the database and the contents of a database may consist of works which enjoy their own protection. Even though the new draft treaty was not adopted then, the subject of *sui generis* protection for databases in some revised form is still being pursued.

**Electronic Rights Management**

As more and more digital copyrightable products in network environment, ranging from electronic documents, produced by digitally scanning from the existing paper based works to multimedia products are emerging, efficient management and controlled distribution of such products, from the legal point of view, has become one of the important considerations, as never before. Realising the importance, in fact, in the new treaties described above, new provisions on obligations concerning rights management information have been included and electronic rights management system has been contemplated. The NII white paper, prepared by Government of U.S.A., focusses on changes in copyright law needed in the networked environment, including provisions of electronic copyright management system.

As given in the treaties 'rights management information' means information which identifies the work, the author of the work, the owner of the work, or information about the terms and conditions of use of the work. Such information may be attached to the copyrighted works electronically. Quite a number of technologies are being explored world over and the components of the electronic copyright management may be: (1) a registration and recordation system, (2) a digital library system with affiliated repositories of copyrighted works, (3) a rights management system, and (4) a transaction monitoring system to check the illegal use of systems. Such a system might be appropriate to NII/GII applications, like digital library, electronic commerce and to those projects within it for which copyright is likely to be an important consideration. A full-fledged prototype of a copyright management system with the above specification is expected to be available in the near future.

**Internet and IPR**

Once simply a tool for a small number of researchers, Internet has blossomed into an appliance of everyday life, a medium accessible from almost every point on the planet, brimming with an inestimable range of data and information. Internet has become a vehicle of a new, global digital economy which has developed the physical world, altering traditional concepts of economic, political and social relations. Everyone with a computer and an Internet connection creates his own web pages and thus becomes a publisher. Hence the rules once applied to only a few companies bind millions of people. While more and more technologies and applications are emerging to enhance the full potential of Internet, it has raised a number of debatable questions with regard to applicability of IPR in such an environment. At the same time, alternative IPR rules are being attempted, though it may take a longer time to get adopted. Network enthusiasts, pioneers of Internet, assert that Internet is the
global medium for rapid digital dissemination of information and information needs to be free. But the content industries and right holders consider Internet as one gigantic copying machine and believe in metering every drop of knowledge. In the following sections, we look at some of the issues raised relating to Internet applications.

Web Publishing and Copyright

World Wide Web has become the most powerful tool for Internet applications. Let us focus on the mechanics of Web-based information and the copyright law. Putting aside the hyperlink scenario for the moment, it is possible that when a user looks at the information on a Web site, the copy being viewed is merely one that was made by the Web site owner and transmitted to the user upon request. In this case, the copyright infringement issue becomes irrelevant because no one other than the copyright owner reproduced copies, prepared derivative works, distributed copies, as prescribed by the copyright laws. However, the lawmakers emphasize that for a user to be able to view the work that was transmitted to the user's browser from the web site, a copy could be made that resides at least temporarily in the RAM of the user's computer. Extending the argument, multiple copies of the work may be made at the intermediate machines, as it travels from source to destination, in which case each of these copies may need to be sanctioned by the copyright owner if the copyright law is amended to include temporary or transient reproduction of the copyrightable works on the network. This amendment also would hold the Internet service providers and telecommunication providers liable regarding temporary but illegal copies passing through their facilities. Due to the controversial nature of this issue, the proposed law to extend reproduction rights for temporary reproduction has not been included in the new treaties of the WIPO.

A hyperlink used by a Web site does not directly cause copying of any substantive content by anyone, but instead merely provides a pointer to another site. The linked site’s URL that the linking site provides to its users is a fact that should not be protectable. If this is so, the question arises with regard to infringement in the act of creating an unauthorised hyperlink. In an ordinary linking situation, the linking site uses a brief textual or graphical reference designed to inform the user of the linked site's content. The use of such informational references can be justified either by asserting that they are not copyrightable or by asserting that they are a fair use of the original author’s work permissible under copyright law. Readers are free to go and look up a book reference and, by analogy, should be free to click on a hyperlink even though the Web site owner may feel that access to material in the particular site should be gained only by accessing the site directly and the linking site contributes to the act of infringement.

Electronic Commerce

The potential of Internet is the most evident in the global trade services, including software, entertainment and information products and professional services. Electronic commerce has the ability to revolutionise trade in this area and others by lowering transaction costs dramatically and facilitating new types of commercial transactions. Development of NII, which will serve as the model for GII, in terms of electronic commerce affords the promise of:
• Enhanced competitiveness for business at the national level and the promotion of job creation, and economic growth.

• Technology, trade and business opportunities for new products and new markets for industries.

• A wider variety and greater number of choices for consumers of books, movies, music, computer programs and other copyrighted works.

• Increased competition and reduced prices.

Many business and consumers are still wary of conducting extensive business in cyberspace because of the lack of a predictable legal environment governing transactions and resulting concerns about liability, intellectual property protection, privacy, security and other matters.

Commerce on Internet involves the sale and licensing of intellectual property. To promote an effective environment, sellers must know that their intellectual property will not be pirated and buyers must know that they are obtaining authentic products and not pirated copies. For this reason, international agreements that establish clear and effective copyright, patent and trademark protection are necessary to protect against piracy and fraud. While technical means of protection, such as encryption, can help combat piracy, an adequate legal framework also is necessary to deter piracy and fraud and to provide legal remedies when these crimes do occur. While commerce on Internet has paved the way for GII for global trade, some of the potential IPR issues that may arise in this environment and which are to be addressed are:

• The liability of on-line service providers.

• Fair uses of copyrighted material, effective management of copyright information.

• An effective patent system, that encourages and protects GII related novel and non-obvious innovations.

• International standards for determining the validity of patent claims.

• Conflicts that may arise due to trademarks, like the terms used in each country, same or similar trademarks owned by different parties in different countries, etc.

• Similarity of Internet domain names and registered trademarks.

To address these issues each national government should tailor their protection according to international agreements, in such a way that reflects the preservation of their national interests. While some of the issues may be solved by proper amendment to domestic legislations, implications of others may need to be analysed carefully to sustain the balance between various interests.

**Digital Libraries**

Traditionally, the library has been the principal point of access for books, journals, government and public domain information for the public as well as specialised research users. With the continual advancement of digital computing, storage technology, and widespread use of Internet, digital research libraries or simply digital libraries are emerging. CD-ROMs are replacing journals and books. The customers want information from library on-line through network. It is now feasible to reproduce, emulate and extend the service provided by the conventional libraries based on paper and other means of collecting, cataloguing, searching
and disseminating information. Due to financial pressure to reduce subscription of paper based journals, the technological upgradation is being expected by the user community with Internet as the delivery medium. The successful growth and use of digital library will depend on the resolution of IPR issues, copyright in particular, from the viewpoint of browsing of electronic materials, library exemptions, etc. The traditional copyright provides that in certain circumstances and under certain conditions it is not an infringement of copyright for public libraries or archives to reproduce or distribute one copy or phonorecord of a work. The conditions of the library exemption are that: (1) the reproduction or distribution is made without any purpose of commercial advantage, (2) the collections of the library are open to the public or available to researchers, and (3) reproduction or distribution of the work includes a notice of copyright. But in the case of digital libraries, due to the characteristic of digital media, as explained in the previous sections, such an exemption is under threat. Another issue worth mentioning is browsing of electronic materials, an act we take it for granted in libraries, and browsing works on-line. Browsing of books/printed material in book stores and libraries has been a legitimate intellectual interface with the author. This has been an important component of learning. With written material in the digital era being available through electronic media, it may be necessary to ensure that the right to on-line browsing is sustained. Provisions of WIPO or any other treaty dealing with digital library in generic sense should be consistent with the age-old philosophy of widest public access to the library.

Digital Broadcasting and Convergence

Digital broadcasting forms an important component of the emerging global information society, as a result of the rapid digitalisation and convergence of computers, communication, consumer electronics (TV) and contents. With digital signal processing opening the way to advanced compression techniques, like MPEG, and to multimedia systems which will be interconnected by the information highways and low-orbiting satellite galaxy, digital broadcasting is gaining popularity and it offers a number of benefits to the consumer, namely, good quality audio/video from Standard Definition TV (SDTV) up to High Definition TV (HDTV), and multitude of programmes. Apart from receiving broadcasts, and working as a digital CD video, home computers, the future TV receivers could work as digital telecommunication services through ISDN or Internet. A large number of projects are already under various stages of planning and implementation.

In the past, broadcasting regulations dealt primarily with contents, distinct from telecommunication services. However, the situation is changing fast leading to new issues to be tackled. For example, satellite based video services (DTH) in the United States is regarded as a telecommunication service, whereas in Europe, DTH is considered a broadcast service like conventional television and is therefore part of a different regulatory regime.

Broadly, IPR framework may need to address various concerns from the broadcasters' and right holders' point of view. For example:

- To evolve clarity of copyright transfers as there are multiple right holders - providers
of terrestrial, satellite, pay-TV and pay per view, Direct-to-Home (DTH) services, the content producer, and carrier, etc.

- To handle multiplicity of creative rights - writers, music composers, performers, special effort providers, computer graphics designers, etc.
- To evolve framework for IPR protection in the multi-channel, multi-platform age.
- To balance the interest of the carrier and service providers and the manner in which this could be done.

It is also important to have built in safeguards for public service broadcasters to meet their non-revenue generating obligations in the intensely competitive digital market place. These are only some of the IPR issues which are likely to come into fore, when digital broadcasting and effect of technological convergence on it come into being on a commercial scale.

**Conclusion**

With the new WIPO treaties, the process of adapting the international rights regime responding to the needs of ensuing global digital economy has just begun. The twin forces of digitalisation and globalisation have set in motion probably a new way of looking at IPR issues which should harmonise the interests and rights of all concerned in the economy and market place: content providers, on-line service providers, hardware manufacturers, the academic community and the general public. Also it should recognise the fact that any international norm setting needs to take note of the wide diversity in market structures, market performances, dissemination of technologies, comparative advantages, and the nation’s capabilities to develop and assimilate technologies. The new WIPO treaties represent the level of protection at which global harmonization is possible today, which understandably represents a gradual and cautious approach.

Today, the pace of digital technologies and associated convergence and the push in terms of their application to gain economic dominance in global market is taking place at speed not known in the history before. Legal and regulatory framework find it hard to cope up with. We have attempted to present ‘Digital Agenda’ for IPRs to be addressed in the digital era. In this rapidly changing field, these could only be taken as illustrative. However, the primary purpose of the study is to keep the issues in focus and judiciously participate in the development of globalised IPR regime which could be beneficial for the country and strengthen our comparative and competitive advantages to be a part of global digital economy.

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