



Department of Law

Copyright in the Digital Environment

Ontologies of Copyright and Digital Works

Primavera De Filippi

Thesis submitted for assessment with a view to obtaining the degree of
Doctor of Laws of the European University Institute

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EUROPEAN UNIVERSITY INSTITUTE
Department of Law

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This thesis has been submitted for language correction.

SUMMARY

The advent of Internet and digital technologies has radically transformed the way information is being produced and consumed. The consequences for copyright law are twofold. While digital media provide new opportunities for authors to produce and disseminate their works to the public, they simultaneously encourage and facilitate copyright infringement.

Traditionally, in order to ensure compliance with the law, the copyright regime could rely upon the properties of physical media to constitute a natural barrier against copyright infringement. As the medium went digital, however, its properties became a catalyst for infringement. Designed for the physical world, the structure of the copyright does not adequately address the issues inherent to digital media.

Private regulation therefore came into play in order to resolve the problem. While restrictive licensing agreements combined with technological measures of protection purport to reestablish a technological barrier against copyright infringement, permissive licenses such as Creative Commons purport to reduce the scope of protection granted by default under the law. Although differing in method, these approaches share a common goal: to realign the properties of the work with the properties of the digital medium by readjusting the legal attributes and technical characteristics of digital copies.

As a legal concept, however, the notion of a copy must be precisely defined. After performing an ontological analysis of the copyright regime within the scope of the Functional Requirements for Bibliographic Records and the Information Artifact Ontology, the research concludes that physical copies fundamentally differ from their digital counterpart. While the former qualify as a token, the latter qualify as a class that is capable of multiple instantiations. Moreover, given that the identity of a digital copy can no longer be defined by its physical characteristics, it is fundamentally for the copyright license to determine the scope of the copy to which it refers.

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INTRODUCTION

AREAS OF STUDY

This world is but a canvas to our imagination, said Henry David Thoreau. Art can be found everywhere around us, and yet the various instances thereof are very difficult to identify. As the product of human endeavor, the work of art encompasses a large variety of activities and modes of expressions which may assume many different aspects and forms. For thousands of years, people have been trying to answer questions such as: What is art? What exactly constitutes a work of authorship? And what determines the artistic character of a work? Most of these questions were asked in vain, as there is not, as of yet, a universally accepted definition of art.

Today, with the advent of the information society, the concerns underlying these questions have found their way into most of our daily activities. In the context of this research, they will be addressed from a strict legal standpoint, with a focus on more tractable issues. The focus of the research will therefore be (1) to identify what may or may not be regarded as a work of authorship for the purposes of the copyright regime, and (2) to perform an ontological analysis of every constitutive element thereof in order to determine the way in which such elements likely to interact with the provisions of copyright law.

In the common sense of the term, a work of authorship is a particular piece of information which constitutes an original intellectual creation. As such, a work can only be experienced after it has been incorporated into a tangible medium of expression - in the form of texts, sounds, images, videos, and so forth. Regardless of its tangible physical representation, the immaterial nature of information is such that the content thereof can eventually be appropriated by third parties without incurring significant costs on their part, nor imposing any additional cost on the creator. Indeed, given that it assumes the basic characteristics of a public good,¹ after a work has been made available to the public, it is difficult to control the subsequent dissemination thereof. This is especially true in the digital environment, where, as a result of Internet and digital technologies, information can be reproduced by anyone, at virtually no costs, and be further redistributed on a global scale and in virtually no time.

¹ Information is generally regarded as a public good to the extent that it is non-rival – i.e. the consumption of information by one person does not preclude the consumption of the same piece of information by others, and non-excludible – i.e. after it has been disclosed to the public, it is difficult to prevent anyone from accessing a particular piece of information. The problem with information goods is that, unless the consumption and the exploitation thereof has been regulated by other means, the likelihood of free-riding over the investment of authors and creators is likely to result into a sub-optimal production of works. More details on the nature of information and the properties of information goods can be found in Part II. Chapter 6. Section 1.A: The Nature of Information and Section 1. B: The Nature of Information Goods.

It is commonly understood that, in order to reduce the opportunities for free-riding over the investment of others, certain types of information may require some kind of legal protection. Copyright law is the particular section of intellectual property law that relates to cultural and creative works. The idea is to transform a public good like information into a private commodity that can be exchanged on the market for information goods.² Authors are granted not only a series of moral rights (i.e. the right to be recognized as the author of a work, the right to ensure the integrity of the work, etc), but also a series of exclusive economic rights (i.e. the exclusive right of reproduction, distribution, communication to the public, etc) that enable them to control the exploitation of their works up to the point in which the copyright has expired. Before third parties can engage into any act of exploitation that would otherwise qualify as copyright infringement, these rights must be licensed or transferred to a third party.

The function of the copyright regime is not limited to ensuring adequate compensation for the creative endeavor of authors. It is ultimately aimed at promoting the production and the dissemination of culture for the ultimate benefit of society. In order to achieve this purpose, the copyright vesting in a work should protect the expression of any original work of authorship against the unauthorized exploitation thereof only to the extent necessary as to ensure an optimal production of works, whereas users should be entitled to use or to consume these works for any legitimate purpose that is unlikely to jeopardize the commercial exploitation of the work.

Conceived as a means to promote the production and dissemination of cultural works, the provisions of the copyright regime must be constantly revised in order to reflect the changes that occur in society. Not only did the Internet and digital technologies dramatically increase the quantity of works that have become available to the public, but they also drastically changed the way in which information is being produced and communicated to the public. Although it is likely to benefit society as a whole, the advent of these new technologies resulted in a series of concerns which have seriously challenged the copyright regime in the digital environment. In order for the law to adapt to the specificities of the digital world and as an attempt to bring together the copyright regimes of different jurisdictions under a common framework, a process of harmonization has begun and a series of legislative reforms have been enacted. Yet, while the scope of the copyright regime has been extended to cover new forms of exploitation,³ the law is still unable to operate

² While the law may grant a series of proprietary rights over a particular work of authorship, the copyright does not however amount to an actual right of ownership over the work. Even though the copyright owner enjoys a series of exclusive rights over the exploitation of that work - with regard to e.g. the reproduction, distribution, or communication thereof, the work is not - as such - owned by anyone. Copyright law eliminates the problem related to the public good character of information goods, not by turning information itself into a private good, but rather by introducing a series of new rights which are fundamentally private and rivalrous in consumption and which can therefore be traded on the market for information goods. See HARDY, T. (2006) Copyright Law, Public Goods, and Incentives. *Intellectual Property Scholars' Conference*. Boalt Hall. University of California at Berkeley.

³ At the international level, the WIPO Copyright Treaty (WCT) and WIPO Performances and Phonograms Treaty (WPPT) of 1996 required every member of the TRIPS Agreement to introduce a series of changes into the national implementation of the copyright regime in order to regulate the new form of exploitations that have emerged in the digital environment. Common examples are the introduction of the right of making available to the public - whose scope is much broader than the traditional concept of communication to the public, as well the introduction of legal protection for technological measures and their corresponding rights management information - whose circumvention and/or modification is prohibited regardless of the actual objective thereof. A more

successfully in the digital environment – either because it has been improperly reformed, or as a result of the legislative process not being able to keep up with the pace of technological advances.

The success of the copyright regime ultimately depends upon the extent to which the law can satisfy the interests of right holders, while simultaneously furthering the interests of the community of end-users. The problem is, however, that, instead of finding a balance between the interests of the different stakeholders involved, most of the legislative reforms which have been implemented so far fundamentally lean towards the interests of right holders.⁴ Most notable is the additional layer of protection granted to certain technological measures of protection, which may drastically reduce the ability for end-users to access or to consume information in a digital format.⁵ So far, legislative reforms have been generally unable to properly account for the regulation of copyright in the digital environment. While they considerably restrained the rights of users, they have failed to eliminate piracy on the Internet.

Generally speaking, both in the physical and in the digital world, the manner in which any original work of authorship can be legitimately consumed is determined by a combination of default statutory rules and

comprehensive overview of the various reforms implemented into the copyright regime of different jurisdictions is provided in Part I. Chapter 1: Copyright Law. Section 2.A: Legislative Reforms.

⁴ The function of copyright law is to establish a balance between the interests of right holders and the interests of the public at large. Yet, it is often believed that, insofar as these contrasting interests cannot be easily reconciled, copyright law must necessarily choose one over the other. In particular, the way in which the copyright regime has been reformed to address the challenges of the digital environment has often been accused to be more focused on protecting the revenues of right holders, rather than furthering the interest of society at large. See, *inter alia*, ELKIN-KOREN, N. (1996) Public/Private and Copyright Reform in Cyberspace. *Journal of Computer-Mediated Communication*, 2, PATRY, W. (1997) Failure of the American Copyright System: Protecting the Idle Rich. *Notre Dame Law Review*, 72, BOYLE, J. (2003) The Second Enclosure Movement and the Construction of the Public Domain. *Law and Contemporary Problems*, 66, SELL, S. K. (2003) *Private Power, Public Law: The Globalization of Intellectual Property Rights*, Cambridge University Press, HOUWELING, M. S. V. (2005) Distributive Values in Copyright. *Texas Law Review*, 86, UGUCCIONI, J. (2007) Bias over balance in copyright reform? *Select Committee on Culture, Media and Sport, 5th report*. New Media and the Creative Industries.

⁵ As a result of the legislative reforms of the copyright regime, whenever a work is protected by technological measures of protection, it becomes subject to a different set of exemptions than a physical work. According to the WIPO Copyright Treaty – as it has been implemented in Europe by the Directive 2001/29/EC of the harmonization of certain aspects of copyright and related rights in the information society, and in the USA by the Digital Millennium Copyright Act of 1996 – it is prohibited to circumvent a technological measure of protection regardless of whether or not it is necessary in order to perform a legitimate act under the copyright regime. In many jurisdictions, the additional layer of protection granted to technological measures is in fact subject to a different regime of exemptions which is much more limited than the standard set of limitations traditionally granted under copyright law. See e.g. section 1201 of the Digital Millennium Copyright Act, which stipulates an autonomous regime of exceptions allowing for the circumvention of technological measures in a few restricted circumstances, and article 6(4) of the European Directive 2001/29/EC, which stipulates that the standard regime of exemption provided for in Article 5 of the Directive should only be ensured to the extent that there exist no voluntary measures taken by right holders, i.e. private agreements. For more details on the way in which anti-circumvention laws have affected the consumptions of digital works, see e.g. DUSOLLIER, S. (1999) Electrifying the fence: the legal protection of technological measures for protecting copyright. *European Intellectual Property Review*, 6, BECHTOLD, S. (2002) From Copyright to Information Law: Implications of Digital Rights Management. IN SANDER, T. (Ed.) *Security and Privacy in Digital Rights Management*. Berlin, Springer, MULLIGAN, D. K. (2003) Digital rights management and fair use by design. *Communications of the ACM*, 46, MITCHELL, J. T. (2004) DRM: The Good, the Bad, and the Ugly. *Colleges, Code and Copyright: The Impact of Digital Networks and Technological Controls on Copyright*. American Library Association. A more detailed overview of the laws against the circumvention of technological measures can be found in Part I. Chapter 1: Copyright law. Section 2.A: Legislative Reforms.

contractual provisions. Given the current deficiencies of the law, private regulation has progressively become the predominant form of regulation in the digital environment. To the extent that they are not satisfied with the law, right holders can seek recourse in private regulation. Through the mechanisms of private ordering, copyright owners can either expand or reduce the default level of protection they have been granted with under the law, in order to restrict or to allow the use of certain resources by the public. This can be achieved through the deployment of contractual agreements and technological measures of protection which automatically enforce the terms and conditions of the licensing agreement. Rather than obtaining ownership over the copy of a work, it has become standard practice for users to only acquire the right to exploit a particular copy of the work according to the terms and conditions of different end-user licensing agreements. As a result of this new approach to licensing, many provisions of the copyright regime can be fundamentally ignored - to be eventually supplanted by a series of private mechanisms intended to regulate the exploitation of a work by technological and contractual means.

In spite of the growing significance assumed by private ordering in the digital world, the State still has a role to play in the regulation of information. On the one hand, government intervention can reduce the risk of market failures due to a lack of protection for the production of cultural goods. It can therefore be justified on account of the positive externalities resulting from an increased production and consumption of information. On the other hand, private restrictions on the way in which information can be legitimately produced or consumed are likely to generate a greater cost on society, which is unlikely to be accounted for by the copyright owner. Thus, the State has to make sure that the contractual framework established by private regulation remains compliant with the public interest.

According to the principle of freedom of contract, private parties are entitled to enter into any contractual agreement without any governmental intervention. Yet, limitations on contractual freedom can be justified on a series of grounds, such as, e.g. positive or negative externalities, disparities of power, information asymmetries, consumer protection, and so forth. Moreover, under certain circumstances, government intervention can limit the enforcement of certain contractual terms that would otherwise undermine public policy. In particular, the granting of a series of proprietary rights over the exploitation of a work is ultimately aimed at increasing the overall number of works available to society. As such, the State must ensure that none of the contractual restrictions introduced by private ordering run counter the interests of society as a whole. In particular, given the strong asymmetry of information that characterizes the market for information goods, the State should be entitled to intervene in order to prevent the introduction of unfair terms and conditions into a copyright license.

In the first part of the thesis, different licensing practices will be analyzed in order to identify their respective advantages and drawbacks from the perspective of both right holders and society as a whole. Although their legal status may vary from one jurisdiction to another, the validity and enforceability of their most common provisions will be assessed against the provisions of the copyright regime and other relevant bodies of law, in order to determine the impact they are likely to have on the production and the consumption of information.

RESTRICTIVE LICENSING AGREEMENTS

While a copyright license represents the permission to do something that would otherwise constitute copyright infringement, nothing can prevent the licensor from introducing contractual provisions in order to restrict the access and to control the usage of a work. Moreover, if contractual provisions alone are considered too weak to protect the interests of right holders in the digital environment, technological measures of protection can also be incorporated into a digital work in order to further restrict consumption.

Combined together, contractual provisions and technological measures of protection can be relied upon in order to achieve extensive price discrimination. This approach is likely to increase the profits of right holders while simultaneously increasing the overall welfare of society by reducing the deadweight loss generated by the copyright regime (i.e. price discrimination can reduce the number of users who cannot purchase a work, its price being too high, by allowing for specific uses of the work, often limited in time or in scope, to be offered at a lower price).⁶ In particular, technological measures of protection allow to price discriminate between end-users as a result of self-selection, without the need to determine the maximum willingness to pay of every individual user. Technological measures also enable right holders to monitor the usage and the consumption of their works, as well as to prevent arbitrage between different classes of consumers

The problem, however, is that this particular mode of protection creates an opportunity for right holders to release their works under very restrictive terms and conditions that reduce the default scope of copyright protection. This can be problematic because, to the extent that it can bypass the copyright regime, private ordering does not have to account for any considerations of public interest. For instance, most DRM systems or other automated systems are likely to impinge upon the consumers' right to privacy in order to protect the interests of right holders.⁷ In addition, for the purposes of price discrimination, content providers are likely to offer products whose features have been intentionally disabled by technological measures and which may even be detrimental to the security or integrity of the device into which they have been stored.⁸ Besides, by decreasing interoperability, technological measures of protection reduce the number of devices on which a work can be accessed. Restrictive licensing agreements combined with technological measures of protection

⁶ Price discrimination is assuming an ever more important role in the digital environment. The advantage of differential pricing in the context of copyright works is the reduced deadweight loss for society on the one hand, and greater economic gains for right holders on the other.. More details on the benefits of private ordering can be found in Part I. Chapter 3: Private regulation: Technological measures Section 2: Benefits. Yet, although price discrimination is generally regarded as a desirable tool to increase the efficiency of the economy, it is often being opposed by the public. See, e.g. ODLYZKO, A. M. (2004) Privacy, Economics, and Price Discrimination on the Internet. IN CAMP, L. J. & LEWIS, S. (Eds.) *Economics of Information Security*. Kluwer.

⁷ Online privacy is being constantly threatened by the deployment of more sophisticated DRM systems that monitor the usage of a work and report back to the corresponding right holders every act of exploitation which has been performed by end-users. See, e.g. COHEN, J. E. (2003) DRM and Privacy. *Berkeley Technology Law Journal*, 18. For more details, see Part I. Chapter 3: Private Regulation: Technological Measures. Section 4.B: Privacy

⁸ The problem with DRM systems is that they often produce inferior products – i.e. that can only be accessed on certain certified devices, or that cannot be freely consumed, reproduced, remixed, or even just saved for later use- which are however more expensive than the products that can be found on the Internet at no cost and without any technological protection. See e.g. Jordan Frith – The customer is always wrong: The problems with digital rights management.

are thus likely to have a negative impact on society to the extent that they can be used to foreclose competition on the market of substitute and complementary devices. Interoperability between different technological measures is one of the most significant problems in the context of DRM systems. Not only is the lack of interoperability between different DRM systems likely to harm consumers who can only access a work a particular set of devices, but it is also likely to stifle innovation and competition on the market to the extent that, unless all the necessary information has been released to the public, it becomes impossible for competitors to implement an interoperable device or to insert a compatible technology into their own devices.⁹

Finally, the validity and enforceability of certain licensing agreements can be questioned under the framework of contract law. In particular, given that most end-user licensing agreements are offered on a take-it-or-leave-it basis, their corresponding enforceability under contract law fundamentally depends upon whether or not they qualify as contracts of adhesion (i.e. a contract offered under circumstances requiring one party to accept or reject the contract as a whole without having the opportunity to negotiate). Although the validity of many shrink-wrap and click-wrap licenses has nowadays been recognized in many jurisdictions, the extent to which their corresponding terms and conditions can actually be enforced under the law is still open to debate.¹⁰

OPEN CONTENT LICENSES

As the problems related to restrictive practices have become apparent, Open Content licenses have acquired increasing popularity in view of the benefits they can bring, not only to the authors themselves, but also to society at large. These licenses provide for a broader dissemination of works by reducing the default scope of protection granted under the law, while allowing for a certain degree of control to be maintained over the

⁹ For more details on the issues related to the interoperability of DRM systems both in the Europe and in the USA, see e.g. VALIMAKI, M. & OKSANEN, V. (2006) DRM Interoperability and Intellectual Property Policy in Europe. *European Intellectual Property Review*, 26, LIPTON, J. (2005) The Law of Unintended Consequences: The Digital Millennium Copyright act and Interoperability. *Washington and Lee Law Review*, 62.. More details can be found in Part I. Chapter 3: Private Regulation: Technological Measures. Section 3.D: Anti-Competitive Practices.

¹⁰ When purchasing the copy of a work, ownership is transferred only to the medium in which the work is embodied (e.g. a CD-ROM). The work itself is still owned by the copyright owner, but a license is granted to the user allowing for a certain usage thereof. The problem is that in the digital environment, the copyright licenses under which a work is released are increasingly offered on a take-it-or-leave-it basis, where the user has no way to negotiate the terms and conditions of the license and are sometimes not even fully aware of them. The validity of these mass-market licenses is therefore not guaranteed, and the extent to which they can be enforced under the law is still to be established. For a more detailed account of the legal status of certain end-user licensing agreements, see Part I. Chapter 3: Private Regulation: Technological measures. Section 1: Legal status. For further discussion on the legal status of shrink-wrap licenses, see e.g. STERN, R. H. (1985) Shrink-Wrap Licenses of Mass Marketed Software: Enforceable Contracts or Whistling in the Dark? *Rutgers Computer & Technology Law Journal*, 11, GOODMAN, B. (1999) Honey, I shrink-wrapped the consumer: the shrink-wrap agreement as an adhesion contract. *Cardozo Law Review*, 21, PAETZOLD, R. L. (1991) Contracts Enlarging a Copyright Owner's Rights: A Framework for Determining Unenforceability. *Nebraska Law Review*, 68, RYAN, M. G. (1989) Offers users can't refuse: Shrink-wrap licenses agreements as enforceable adhesion contracts. *Cardozo Law Review*, 10, EINHORN, D. A. (1995) Shrink-Wrap Licenses: The Debate Continues. *IDEA: The Journal of Law and Technology*, 38.

exploitation thereof. By providing incentives for authors to make their works freely available on the Internet, Open Content licenses encourage the creation of new works and improvement of previous works.

Yet, the uncertainty surrounding these licenses is likely to raise a series of concerns that may affect both authors and end-users. In spite of the extensive process of harmonization undertaken, substantial differences still exist between the national implementations of the copyright regime. In view of the differences in the legal systems, the same license may therefore enjoy a different legal status in different jurisdictions.¹¹ This is relevant because any provision that extends beyond the scope of the copyright regime cannot be enforced under the framework of copyright law, but only on the basis of contract law. Hence, the extent to which the provisions of a license can be enforced against third parties ultimately depends upon whether or not the license can be regarded as an actual contractual agreement - as opposed to a bare license. Another problem, usually encountered in the case of works developed through the collaborative effort of a large number of contributors, is that it is often difficult to distinguish between the co-owners and the joint-owners of a work - the identity of which is likely to have a significant impact upon the validity and the enforceability of a license.¹²

Accordingly, given that copyright law is based upon a strict liability regime, the legal uncertainty associated with the majority of Open Content licenses may actually prevent authors and end-users from engaging into the exploitation of a particular work of authorship, unless they are willing to bear the risk of being sued for copyright infringement.

¹¹ Because of the rare occasions in which Open Content licenses have actually been brought to court, it is difficult to determine their legal status, which is also likely to differ from one jurisdiction to the other. For more details, see Part I. Chapter 4: Private Regulation. Section 4.E: Jurisdictional Concerns. A common problem with Open Content licenses is that they often require a series of moral rights to be waived (such as e.g. the right to the integrity of the work or the right of withdrawal) – although this is generally not possible in many civil law jurisdictions. See, e.g. POSSE, R. I. (2009) The legal status of copyleft before the Spanish courts. *Journal of Intellectual Property and Practice*, 4. Another problem relates to the questions of whether an Open Content license qualifies as a contract or as a bare license which may be unilaterally revoked at any time. See, e.g. KENNEDY, D. M. (2001) A Primer on Open Source Licensing Legal Issues: Copyright, Copyleft and Copyfuture. *St. Louis University Public Law Review*, 20, KROWNE, A. & PUZIO, R. (2006) The fog of copyleft. *First Monday*, 11. A better overview of the legal status of Open Content licenses can be found in Part I. Chapter 4: Private Regulation: Open Content. Section 2: Legal status, and, in particular, Section 4.A: Enforceability and Section 4.B: Revocability.

¹² Many collaborative platforms on the Internet rely on Open Content licenses in order to release the output produced by the community of users. The problem is to determine who owns the copyright to the resulting work, which can be extremely difficult given that the content can be contributed by many different authors. Unless the platforms provide a method to identify individual contributions and to ensure that authors agree to license their contribution under an open content license. It is often the case, however, that contributions are anonymous, or that is impossible to clearly distinguish between one contribution and the others. The result is a situation of legal uncertainty, where in spite of a work being released under an Open Content, the exploitation of that work by third parties may nonetheless qualify as copyright infringement. See BOTTERBUSCH, H. R. & PARKER, P. (2008) Copyright and Collaborative Spaces: Open Licensing and Wikis. *Techtrends*, 52. For more details, Part I. Chapter 4: Private Regulation: Open Content. Section 4.C Copyright Ownership.

RESEARCH FOCUS

The objective of this research is to determine the scope of the copyright and the object of the rights licensed under different contractual agreements. The difficulty lies in the fact that the copyright regime does not expressly identify the entities to which the copyright ultimately refers.

Copyright protection extends far beyond the physical medium of expression into which a work inheres. Not only does copyright law prohibits the reproduction of physical instances of the work -copies- in any manner or form (i.e. whether or not they maintain the same physical properties as the original), but it also precludes the making of derivative works on the basis of preexisting works (e.g. a literary work implemented into a movie), as well as communication and making available thereof. It seems therefore that copyright protection is concerned with an abstract entity (the work) whose scope is larger than that of the individual expressions and physical realizations thereof. Conversely, most of the rights granted to end-users traditionally refer to the physical instances of the work (e.g. a book). Although this has never been a problem in the physical world, this has become problematic in the digital realm, where any given instance of a work (e.g. a digital file) can be duplicated or recreated in different systems and locations without necessarily losing its identity as a particular copy of the work.

Identifying the object of the copyright is therefore an important precondition to determine the scope of copyright protection. While its definition may vary according to the context of analysis, the objective of this research is to identify what may or may not qualify as a work - and as a particular instance of a work - for the purpose of the copyright regime. Yet, if the scope of the rights granted under a copyright license can only be established after having identified the object of these rights, the proper definition of a work in the context of copyright law necessarily requires an accurate definition of its constitutive elements.

An ontological analysis of the copyright regime could help identify the various components of a work which are actually eligible for protection, as well as to describe the relationship they entertain with each other and with the provisions of copyright law.

An ontological framework, defined as a structured set of concepts intended to capture the relevant aspects of a certain domain of reality,¹³ must be designed to be used in the context of the licensing of rights. Such an ontological framework must be able to accommodate different works of authorship into a common framework where every one of their components can be independently identified. Yet, while the terms and conditions of every copyright license can be described by means of concepts (ontologies) pertaining to the realm of copyright

¹³ Any given portion of reality can be articulated into a series of abstractions that constitute the relevant aspects of that domain. The explicit knowledge about a particular portion of reality is encoded into an ontological framework with a series of interconnected concepts, properties, functions and categories that represent different aspects of reality and the relationship that subsists between them. To the extent that it can be regarded as a common point of agreement amongst the members of a group, such an ontological framework can be employed as a mechanism to communicate a common conceptualization of the world to third parties. For more details on the characteristics and functions of ontologies, see *infra* Part II. Chapter 6: Ontological Framework for Information Goods. Section 2.B: Ontologies of information.

and contract law, the object of the copyright can only be described by way of an ontological framework that pertains to the realm of information content.

In the second part of the thesis, therefore, different ontological frameworks will be considered and their capacity to identify the constitutive elements of a work will be assessed both in the physical and in the digital environment. After addressing their corresponding advantages and drawbacks, the research will investigate whether any of these ontological frameworks could be used as an underlying framework of analysis for the identification of different copies of a work and the corresponding terms and conditions under which they have been released.

CURRENT ONTOLOGICAL FRAMEWORKS

Ontologies are often used in information sciences to describe and analyze a particular portion of reality according to a particular conceptualization of the world. The formal representation of knowledge is generally achieved by means of a shared vocabulary that purports to model a particular domain with a series of interconnected concepts, properties and relations that subsist within that domain. A multitude of different ontological framework are today being employed as a mechanism for organizing information in many fields of endeavors, such as artificial intelligence, informatics, library science and information architecture.

In spite of their increasing relevance in modern society, the ontological status of information goods has yet to be properly established. The problem is that different kinds of information can be described through a variety of components or parts featuring different properties and attributes. Specialized ontologies have thus so far been developed to perform the ontological analysis of only particular types of information.¹⁴

Yet, with the advent of Internet and digital technologies, and considering the growing quantity of information that has become available to the public, it has become necessary to organize information according to an established set of standards and principles that would allow for every piece of information to be consistently and persistently identified over time.

A series of standards have been developed for the purpose of providing an easier classification and a better identification of information - such as the Paris principles of 1961 and the International Standard for the

¹⁴ Specialized ontologies are likely to be created for every field of endeavor in order to reflect the specific vocabulary of that field. See e.g. the Basic Formal Ontology (www.ifomis.org/bfo), a formal upper-level ontology designed to support scientific research; the Ontology for Biomedical Investigations (www.obi-ontology.org), an integrated ontology for the description of biological and clinical investigations; the Lexical Ontologies for Legal Information Sharing project (<http://www.ittig.cnr.it/Ricerca/materiali/lois>), a project aimed at creating a paradigm for accessing legal resources and information; the CIDOC Conceptual Reference Model (www.cidoc-crm.org), an ontology for the identification and the representation of cultural heritage; Cyc (www.cyc.com), a comprehensive ontology for the formal representation of the universe of discourse; Dublin Core (www.dublincore.org), a simple ontology for documents and publishing; the Geopolitical ontology (www.aims.fao.org/geopolitical.owl), an ontology describing geopolitical information created by the Food and Agriculture Organization (FAO); the NIFSTD Ontologies from the Neuroscience Information Framework (www.neuinfo.org), a modular set of ontologies for the neuroscience domain; etc.

Bibliographic Description of monographic publications (ISBD) of 1971. In spite of their significance in the context of bibliographic records, they do not however provide any ontological basis for the identification of what constitutes information.

Only a limited number of ontologies have thus far been developed for the description and identification of different pieces of information pertaining to the realm of culture and the arts.¹⁵ Although developed for different fields of application, the structure of most of these ontological frameworks is sufficiently generic to be applied to the context of copyright law. For the purpose of this research, however, the analysis will focus exclusively on the Functional Requirements for Bibliographic Records (FRBR) - endorsed by the International Federation of Library Association (IFLA) - and on the Information Artifact Ontology (IAO) based upon the architecture of the Basic Formal Ontology (BFO).

FRBR

The Functional Requirements for Bibliographic Records (FRBR) is a simple ontological model whose objective is to assist users in the identification and retrieval of information. Developed by the International Federation of Library Associations and Institutions (IFLA), the FRBR is a conceptual model for the description and identification of bibliographic records,¹⁶ whose role and characteristics will be described extensively in Chapter 7. Here it is sufficient to mention that the conceptual framework of the FRBR is composed of four basic entities:

- the work as a general concept (e.g. Hamlet by Shakespeare),
- the expression articulating the work (e.g. the sequence of words from a particular edition of Hamlet),
- the manifestation (e.g. the typographical arrangement of a published edition),
- and, finally, the item as a physical instance of the manifestation (e.g. a particular copy of the book).

Originally meant for the description of bibliographic records, the FRBR framework can be used to identify the various components of a work that constitute the object of copyright law. In particular, distinguishing between

¹⁵ See, in particular, Ingarden's ontologies of the work of art, which thoroughly investigate the various components that constitute different works of authorship and the relationship they entertain with each other, in INGARDEN, R. & GRABOWICZ, G. G. (1979) *The Literary Work of Art: An Investigation of the Borderlines of Ontology, Logic, and Theory of Language*, Northwestern University Press., as well as the various ontological models provided for in the three essays "The Musical Work", "The Picture", "The Architectural Work" and "The Film" in INGARDEN, R. (1989) *The Ontology of the Work of Art*, Ohio University Press.. Other ontologies have subsequently been developed to identify different pieces of information from a more generic standpoint, such as e.g. the XOBIS (XML Organic Bibliographic Information Schema), the CIDOC Conceptual Reference Model (CRM), the FRBR (Functional Requirements for Bibliographic Records), which has subsequently been combined with the CIDOC CRM in order to produce the FRBROO, and finally, the Information Artifact Ontology (IAO) which is concerned with the description of information artifacts and information content. A more detailed analysis of these different ontologies can be found in Part II. Chapter 6: Ontological Framework for Information Goods. Section 2.B: Ontologies of information.

¹⁶ The framework can be accessed at <http://www.ifla.org/en/publications/functional-requirements-for-bibliographic-records>. A comprehensive analysis of the FRBR framework can be found in Part II. Chapter 7: The FRBR Approach.

the constitutive elements of a work is important in order to properly determine the extent to which the provisions of a copyright license are likely to affect the exploitation of different aspects of that work. It is often the case, in fact, that the different elements of a work (such as, e.g. the literary content of the original manuscript of Hamlet; the preface, notes, illustrations and typographical arrangement of a published edition; the dialogues, screenplay, visual images and soundtrack of a movie based upon the original novel, as well as any preexisting materials it involves, etc) are protected by different copyrights which have been licensed under different terms and conditions. As a result, it is often difficult to determine the actual level of protection that every work has been granted with.

The situation has become even more complex with the advent of digital technologies. Although copyright law does not distinguish between physical and digital works in order to determine whether or not they qualify for protection, a work may be subject to a different level of protection according to whether it subsists in the physical or digital world. In particular, as a result of recent legislative reforms, the protection granted to the various components of a digital work is likely to differ from the protection granted to the constitutive elements of a physical work.

Most importantly, as we shall see, as the concept of the physical item can no longer be used to identify the particular instance of a work in the digital environment, a different entity must necessarily be taken into account in order to fulfill that function.

IAO

Based upon the basic structure and principles of the Basic Formal Ontology (BFO), the Information Artifact Ontology (IAO) is a mid-level ontology concerned with the description and the identification of information artifacts.¹⁷ In addition to the entities provided by the BFO, the IAO introduces the concept of an information artifact, which can be:

- an information content entity (ICE) - e.g. the typographical arrangement of a published edition - that represents the content of a work encoded into a particular format,
- an information carrier - e.g. the particular pattern of ink on the pages of a book - that represents the means by which the content is being conveyed to the public, or
- an information bearer - e.g. the book itself - that represents the medium into which the work inheres.

One problem with the IAO is that does not provide the means to describe or identify a work, as a general concept abstracted from the physical medium in which it is presented. The fact that the IAO is based on a

¹⁷ The Information Artifact Ontology (IAO) is an ontology of information entities developed by Alan Ruttenberg, Barry Smith, Werner Ceusters and several members of the Ontology for Biomedical Investigations (OBI) team, including Melanie Courtot, Bjoern Peters, and James Malone. Based upon the principles of the Basic Formal Ontology (BFO), the IAO focuses on the description of any information artifact which has been produced by a person or by a machine specifically designed to produce and to communicate information to the public. The current implementation of the IAO is available at <http://code.google.com/p/information-artifact-ontology>. A comprehensive analysis of the IAO can be found in Part II. Chapter 9: The IAO Approach.

realist approach is in fact likely to reduce its ability to identify the object of the rights licensed under different contractual agreements. While the information bearer is tantamount to the item and the ICE to the manifestation, it is often the case, however, that the object of the rights licensed under a copyright license ultimately refers to the work as a general concept or to the actual content of the work, which are not as such recognized within the IAO.

Notwithstanding this limitation, Chapter 13 will show that the ontological framework of the IAO can be expanded by means of specifically defined classes intended to emulate the concept of the expression and the notion of the work as they have been defined by the FRBR framework. Insofar as it can simulate the various entities of the FRBR, the IAO is theoretically capable of identifying the constitutive elements of a work at different layers of abstraction.

Yet, for the same reason that the item is no longer able to identify the copy of a digital work, the information bearer can no longer qualify as the copy of a work in the digital environment. Identifying the copy of a digital work is therefore likely to be challenging both for the IAO and the FRBR framework.

THE PROBLEM

Given that the item is the only entity (within the FRBR) that actually subsists in the physical world, it is also the only entity through which the public can experience the work. However, when acquiring the copy of a work, users are entitled to perform only a limited set of operations over said copy, which depends, on the one hand, on the provisions of property law (according to which anyone is entitled to dispose of their property as they will) and, on the other hand, on the provisions of copyright law (according to which nobody can engage into any infringing activity without the consent of the copyright owner). Although the terms and conditions under which the work has been released can obviously increase the range of activities that can be legitimately performed, their scope is however specific to one particular copy of the work. The problem is basically to determine the identity of every copy of the work.

Traditionally, the item represents the copy of a work - whose physical boundaries determine the range of application of the copyright license under which it has been released. The notion of a copy has however been considerably affected with the advent of Internet and digital technologies. Not only can the format of a digital work be continuously adjusted as a result of e.g. compression, encryption, or conversion, but it can also be encoded into a variety of media whose physical representation is likely to change over time. Yet, in spite of the divergence in terms of their physical or digital representation, different instances of a work are nonetheless perceived as the same copy as long as they can be used or consumed interchangeably.

Given the important role assumed by the copy in the context of most end-user licensing agreements, understanding the manner in which the different instances of a work are actually perceived by copyright owners and end-users can be useful for the purposes of the copyright regime. Indeed, given that the copy determines the range of application of the licensing agreement, any user who acquired the right to exploit a particular copy of the work does not necessarily enjoy the right to exploit the same work by any other

means.¹⁸ Accordingly, while every user is entitled to consume the work according to the terms and conditions of the copyright license, in order to ensure compliance with the law, they must first identify the scope of the copy that the licensing agreement ultimately refers to.

The difficulty lies in the fact that, given that the copy of a digital work no longer qualifies as a physical entity, its scope can no longer be determined according to its physical characteristics. In order to remain consistent with the expectations of end-users, a different definition must therefore be assigned to the concept of a copy in the digital environment and a different set of criteria must be taken into account in order to determine the scope of a digital copy. In a world in which information is fast becoming largely and inherently digital, it no longer makes sense to regulate information in accordance with traditional principles of physical property.

PROPOSED SOLUTION

The ‘copy’, in the context of copyright law, is a legal concept whose function is to regroup different instances of a work that fulfill a predefined set of criteria together into a single unit of analysis. While, in the physical world, these criteria ultimately refer to the physical characteristics of the work, they cannot be applied by analogy to the realm of a digital work which no longer has any physical *corpus*. Therefore, an alternative set of criteria must be individuated in order to identify the copy of a work in the digital environment. Yet, given the inherent malleability of digital media, it can be very difficult to establish objective criteria which allows for a digital copy to be consistently identified over time.

In order to overcome this problem, the thesis suggests that the scope of a digital copy should be defined by the provisions of the licensing agreement under which it has been released. If, in the digital environment, the copy of a work cannot be defined according to its physical attributes, it could perhaps be defined by means of its formal and legal attributes - i.e. the terms and conditions under which the copy has been released. Under this approach, the provisions of every end-user licensing agreement represent thus the main factor that determines the scope of a digital copy.¹⁹

If the identity of a copy fundamentally depends upon the provisions of the copyright license under which it has been released, it is ultimately for the copyright owners to determine the scope of the copy by modifying the object and the scope of the various rights and obligations granted under the licensing agreement. While they may differ in terms of their physical or digital representation, different instances of the work may nonetheless be regarded as different instances of the same copy to the extent that they are subject to the same set of legal rules and restrictions. In other words, by stipulating the conditions that must be fulfilled for every instance of

¹⁸ For a better account of the rights acquired by the owner of a copy, see LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership*. *William and Mary Law Review*, 32.

¹⁹ A more detailed analysis of the concept of a copy in the digital environment can be found in Part II. Chapter 11: The Identity of Digital Copies. Section 1.D: Preliminary definition of a Digital Copy.

the work to qualify as a particular copy thereof, the copyright owner can determine the scope of the copy that is being released to the public.²⁰

Thus, as opposed to the physical world, where the terms and conditions of any end-user agreement are limited to the physical copy to which the license refers, in the digital environment, instead, the provisions of every end-user agreement do actually determine the scope of the copy that is being released – which does in turn determine the range of application of the rights granted under the licensing agreement.

The specificity of this approach is that, to the extent that they comply with all formal requirements and legal constraints stipulated under the licensing agreement, different instances of a work could theoretically qualify as different instances of the same copy. Even though a physical copy can only subsist as a single instance, the copy of a digital work is fundamentally capable of multiple instantiations which may or may not subsist at the same time.

Yet, to the extent that they have not been licensed to the same user or category of users, different instances of a work - albeit identical in terms of their physical or digital representation – will necessary be regarded as different copies of the work. While it is not necessary to ensure that every instance has been derived – either directly or indirectly – from the original instance thereof, a specific relationship must nonetheless be established between the different instances of a work in order for them to qualify as the same copy of the work. To be sure, equality between the different instances of a work can only be established on the basis of the terms and conditions of the copyright license under which the copy has been released. Hence, in order for identity to hold, every instance of the copy has to be addressed to the same user or category of users, which ultimately depends upon the recipient of the copyright license under which they have been released.²¹

In spite of its apparent complexity, such a definition is likely to reduce the degree of uncertainty concerning the consumption of digital content. By treating the terms and conditions of every end-user agreement as a series of criteria to determine the scope of the copy to which they refer, it is in fact possible to produce a more objective definition of what constitutes a digital copy. Besides, allowing for a digital copy to retain its identity over time, in spite of the changes it may incur in terms of its physical or digital representation, is likely to be more consistent with the concept of a copy in the mind of most Internet users.

PRACTICAL CONCERNS

The next question is to determine whether such a definition can actually be formalized and incorporated into an ontological framework. After a preliminary analysis, however, it appears that none of the ontological frameworks considered thus far are capable of addressing the challenges associated with the identification of digital copies. Although neither the IAO nor the FRBR is capable of identifying all the constitutive elements of

²⁰ For more details, see Part II. Chapter 11: The Identity of Digital Copies. Section 1: Definition of a Copy. Subsection D.2: Logical equivalence, and Part II. Chapter 13: Digital Copies under the IAO. Section 2.A: Identity Criteria.

²¹ For more details, see Part II. Chapter 13: Digital Copies under the IAO, Section 2.B: User Identity.

a digital work, the two could nonetheless be combined together in order to produce an ontology better suited to the specificities of digital works.

While the terminology of the FRBR is particularly adept at identifying the constitutive elements of a work at higher layers of abstraction, identifying the copy of a digital work is likely to be more problematic, as the requires that each and every entity necessarily subsist within one particular layer of abstraction.²²

In view of its greater flexibility, the IAO could therefore constitute a better alternative. In spite of its limited ability to deal with higher levels of abstraction, the structure of the IAO can be easily extended with a series of defined classes intended to simulate the various entities of the FRBR framework. Yet, even though the IAO may succeed in identifying the different aspects of a work at different layers of abstraction,²³ the issues concerning the description and identification of digital copies would persist nonetheless. Neither the FRBR framework nor the IAO incorporates an entity that is able to identify a digital copy consistently over time.

Without going into unnecessary details regarding the technical implementation thereof, the final part of the thesis investigates a series of conceptual and practical tools for describing the ontological status of a work in the digital environment. The goal is to design a mechanism capable of identifying digital copies and describing the most relevant attributes thereof.

The proposed solution relies upon the implementation of a supplementary class within the framework of the IAO whose identity fundamentally depends upon the terms and conditions of different licensing agreements. The idea is that the formal requirements and legal constraints stipulated within every licensing agreement ultimately determine the scope of the copy to which they each refer. In the context of the IAO, therefore, every copy could be described as one separate class which incorporates a series of information bearers according to whether or not they fulfill a particular set of criteria.

The problem is, however, that the scope of a digital copy can be very difficult to ascertain in the digital world. While the physical representation is likely to evolve over time as a result of a series of transfers and reproductions, the digital format is also likely to vary as a result of compression, encryption, or any other type

²² The structure of the FRBR is such that every entity that subsists at any given layer of abstraction can be incorporated into one or more entities from a lower layer of abstraction (e.g. a work can be articulated into an indefinite number of expressions, which can in turn be embodied into a variety of manifestations, in order to be ultimately incorporated into a series of different items). Conversely, from an opposite direction, every entity that subsists at any given layer of abstraction necessarily incorporates one - and only one - entity (e.g. the item is bound to one manifestation, which fundamentally represents one particular expression of the work, to which it necessarily refers). Within the framework of the FRBR, it is therefore impossible to introduce an entity whose definition is independent of the digital format assumed by the work (i.e. that subsists at a higher level of abstraction than the manifestation) but that may nonetheless assume a different identity in spite of the fact that it incorporates the same manifestation (and which should therefore subsist at a lower level of abstraction than that of the manifestation). For more details, see Part II. Chapter 12: Digital Copies in the FRBR. Section 2: Problems with the FRBR Framework.

²³ The structure of the IAO is such that it can be expanded by means of specifically defined classes. These classes regroup a particular set of entities that fulfill a series of arbitrarily defined criteria into a common framework. Although restricted to a limited number of entities that can be observed in the real world, the terminology of the IAO could theoretically cover the whole range of entities necessary to describe the object of the various rights and obligations stipulated under a copyright licensed. For more details, see Part II. Chapter 13: Digital Copies under the IAO.

of conversion. It is therefore suggested that a unique identifier be assigned to every copy of a work in order to keep track of the various instances thereof. In particular, combining different types of identifiers under a common framework (where different standards can be used to describe a work at different levels of abstraction or granularity)²⁴ could significantly contribute to reducing the complexity associated with the description and the identification of digital works.

In terms of practical implementation, the proper identification of digital copies requires the implementation of a comprehensive system of metadata, in order to ensure that the scope of the various terms and conditions vesting into any given copy of the work can always and unequivocally be identified.²⁵ Specifically, to the extent that the owner of the copyright in a work can determine the scope of every copy released, different instances of the work will be regarded as the same copy only provided that every property thereof - be it either formal or legal - ultimately falls within the range of values stipulated by the terms and conditions of the copyright license.

The last step is to identify whether the different instances of the work have been released under a license that is addressed to the same user, or to the same category of users. Only then is it possible to determine whether they can be regarded as different instances of the same copy— and should therefore be assigned the same ID, or whether each instances qualifies as a different copy of the work and should therefore be assigned a different identifier.

STRUCTURE OF THE THESIS

The thesis is structured as follows:

- Part I introduces the three layers of regulation that simultaneously contribute to regulate the manner and the extent to which information can be legitimately accessed and consumed.
- Chapter 1 begins with an analysis of copyright law as it applies both to the physical and the digital world. After describing the scope of the rights granted under the copyright regime, it investigates the extent to which these rights have been reformed to comply with the specificities of the digital world. Yet, in spite of the process of harmonization carried out at the European and international level,

²⁴ Given that it no longer qualifies as a token (i.e. an individual instance of a type), the concept of a digital copy is capable of many different instantiations. As such, in order to identify the various instances of a work that represents the same copy, a unique identifier should be assigned to every copy of a work – so as to be incorporated into every instance thereof. For a more detailed analysis on the possible implementation of a unique identifier for digital copies, see Part II. Chapter 14: Practical Implementation. Section 1: Unique Identifier.

²⁵ In order to actually implement the approach suggested in the thesis, the idea is to develop a common framework for metadata that is capable of combining different standards into an integrated framework. Rather than implementing a new framework for metadata, an integrated interface would allow for different standards to be employed at the same time in order to describe the different components of a work at different layers of abstraction or granularity, according to what they have been specifically designed for. More details in Part II. Chapter 14: Practical Implementation.

copyright law still does not qualify as a uniform body of law. Chapter 1 proceeds to draw attention to practical and legislative concerns which have yet to be resolved. In particular, this section analyzes the impact of recent legislative reforms in terms of overall market efficiency, accessibility of works and consumer expectations. Finally, in order to explain the challenges that the law has to face in the digital environment, Chapter 1 examines the extent to which the self-regulating features of the copyright regime have been jeopardized with the advent of Internet and digital technologies.

- The following three chapters analyze the structure and the operation of private ordering. They examine how private regulation tried to resolve the problems that had yet to be addressed in the digital world. Chapter 2 begins by analyzing different mechanisms of regulation by private means - which constitute the focus of the next two chapters. Chapter 3 focuses on the use of end-user licensing agreements and technological measures of protection in order to restrict the consumption of digital works beyond the scope of the copyright regime. Chapter 4 then looks at the use of Open Content licenses intended to support a greater dissemination and broader availability of works, amidst other goals. The objective of these chapters is, ultimately, to identify the corresponding advantages and drawbacks of these two divergent approaches.
- Chapter 5 investigates the role of the State in regulating the operations of private ordering. More precisely, this chapter analyzes the extent to which public policy can impose a series of limitations over the regulation of information. It concludes that government intervention can be justified on certain grounds, such as information asymmetries, positive or negative externalities, and public interest.
- Part II is concerned with the analysis of copyright law from an ontological standpoint. It examines the distinctive characteristics of various ontological frameworks designed for different fields of applications and determines whether they could be applied by analogy in the framework of a copyright license.
- Chapter 6 investigates the nature and the properties of information according to different perspectives and approaches. It then provides a definition of information goods and identifies the relationship they entertain with copyright law.
- The following four chapters undertake the analysis of copyright works from the ontological perspective. In order to do so, the thesis alternates between the FRBR framework (chapter 7 and 8) and the IAO (chapter 9 and 10) to identify the constitutive elements of a work and their corresponding relationship with each other. The goal is to determine whether any of these two ontological frameworks could theoretically be employed to describe the scope of copyright protection and the object of the rights granted under different licensing agreements. In spite of their success in the physical world, both frameworks seem to fail in the digital environment, in particular, when it comes to identifying the copies of digital works.
- Chapter 11 provides a definition of what constitutes the copy of a digital work - which is then used as the basis to determine the nature and the scope of a digital copy. In particular, this chapter contends that, as opposed to the physical world, where the physical copy determines the range of application of the copyright license, in the digital world, it is instead the license that determines the scope of the copy to which it refers.
- The following 2 chapters subsequently investigate whether the FRBR (Chapter 12) and the IAO (Chapter 13) could theoretically implement such a concept within their ontological framework and

evaluates the viability of such an implementation. They conclude that, while the FRBR is incapable of identifying the copy of a digital work consistently over time, the structure of the IAO could eventually be extended to accommodate the concept of a digital copy as a defined class.

- The thesis ends with Chapter 14 which presents a preliminary attempt at incorporating the terminology of the IAO into a particular framework of metadata that is to be employed in the context of the licensing of rights.

THE REGULATION OF DIGITAL CONTENT

Content on the Internet is regulated by a combination of public and private ordering. It is possible to identify three different layers which contribute to establishing the regulatory framework for the generation and the distribution of digital content.

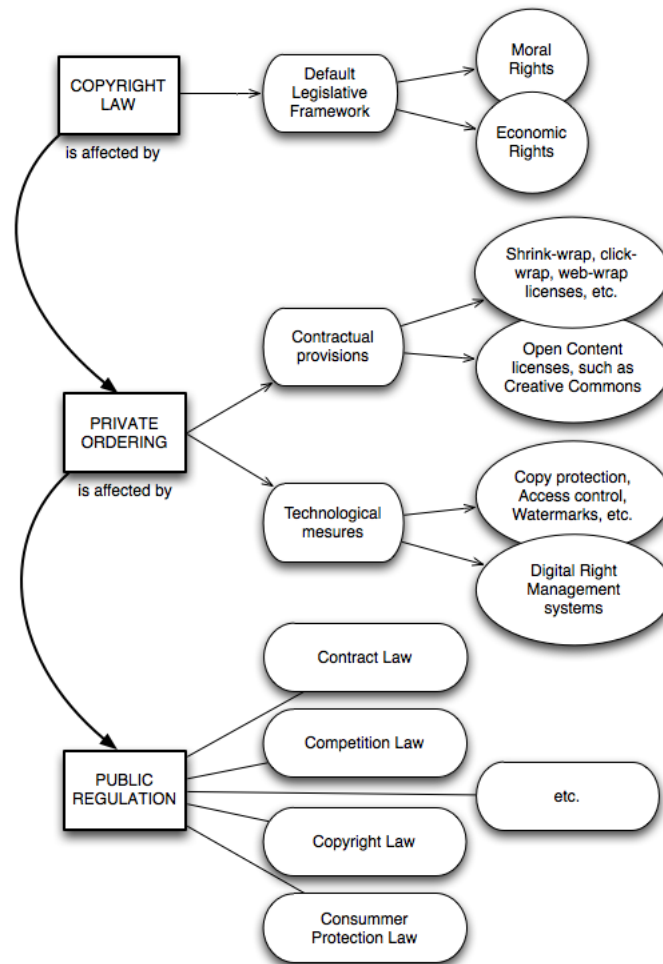
Public regulation mechanisms, such as Intellectual Property law and copyright law, are responsible for setting up the initial body of law regulating the use of and access to information. The provisions of the copyright regime are meant to establish a basic legislative framework for the production and dissemination of content, whose purpose is to encourage cultural production by providing incentives for authors. By default, authors are thus granted a series of exclusive rights over the exploitation of their works, whereas users are provided with a limited number of privileges over the consumption of these works. This initial endowment of rights is, however, not meant to be permanent, rather, it qualifies as a default rule that establishes a series of exclusive rights which can be subsequently reformulated and traded on the market for information goods.

Private ordering comes into play to introduce supplementary provisions or override the default rules of the copyright regime by means of contractual agreements. The extent to which private regulation can alter or substitute the provisions of the copyright regime is ultimately determined by the limits of contract law. As the majority of digital works are, nowadays, no longer being sold to end-users but are instead licensed under particular terms and conditions, private regulation is assuming a predominant role in regulating the way information is exploited in the digital environment.

Private ordering is, however, not immune to government intervention.²⁶ The enforcement of private regulation ultimately depends upon the legitimacy of the private transactions it entails. Public policies and public values can be used as a means to control or restrain the application and efficiency of private ordering. The more impact private ordering has upon the regulation of information, the more it will be subject to public

²⁶ In the digital environment, private ordering has assumed a prevalent role over the regulation of information. Private regulation is in fact aiming towards the creation of an alternative regime apart from copyright law, in which the terms and conditions according to which any piece of content can be legitimately exploited are ultimately dictated by contractual agreements. The provisions of the copyright regime are consequently being increasingly ignored and/or overridden to be replaced by a series of contractual rules established by private parties. Yet, while private ordering may sometimes be regarded as being more efficient in that it reflects the actual will of the parties, it should nevertheless be subject to some form of government control to the extent that it may excessively interfere with the provisions of copyright law. For more details, see e.g. ELKIN-KOREN, N. (1998) Copyrights in Cyberspace: Rights without Laws? *Chicago-Kent Law Review*, 73.

scrutiny and political pressure.²⁷ Whether or not the norms introduced by private regulation should be enforced by the legal system is subject to the discretion of the State, which must ensure that they do not infringe upon the provisions of copyright law or any other bodies of law (such as contract, competition, and consumer protection laws).



²⁷ Private ordering necessarily occurs within the public framework established by the laws of the State. The efficiency and the legitimacy of private regulation are, as a consequence, ultimately dependent upon their respective compliance with the specific values and political decisions of the political system. For more details on the manner in which public regulation is likely to affect the operations of private regulation in the context of copyright law, see e.g. DINWOODIE, G. B. (2004) Private Ordering and the Creation of International Copyright Norms: The Role of Public Structuring. *Journal of Institutional and Theoretical Economy*.

COPYRIGHT LAW

Conceived as an exclusive right granted by the government to a limited number of publishers,²⁸ copyright has subsequently developed into a series of exclusive rights granted to the author of any original work of authorship to encourage cultural production for the ultimate benefit of society.²⁹ The evolution of copyright law fundamentally reflected the changes taking place in society.³⁰ Although it was originally meant for the regulation of trade, copyright, following Locke's discourse on property entitlements, began to be seen as a natural right belonging to the authors as a result of their labor.³¹ As the concept of romantic authorship flourished,³² the foundations for a strong author-based copyright regime were ultimately established.³³ Later, with the development of international trade and the more recent trends towards globalization, a process of harmonization became necessary and a series of international conventions and international treaties have been signed.³⁴ Finally, the advent of Internet and digital technologies has induced further legislative reforms to accommodate the provisions of copyright law with the specificities of the digital environment.³⁵

²⁸ The earliest example of exclusive printing privilege is the system of state privileges that regulated the printing industry in Venice from 1469 (when the first printing privilege has been granted to Johannes de Spira, the publisher who first introduced printing techniques in Venice) until 1570 (when the system of state privileges was repealed and the activity of publishers started being supervised by the guild of printers and booksellers). STAPLETON, J. (2002) *Art, Intellectual Property & the Knowledge Economy*. London, Goldsmiths College, University of London.

²⁹ The Statute of Anne of 1709 is considered to be the first modern copyright statute, which for the first time codified the idea that copyright should be limited to the extent necessary as to provide the incentive for authors to create and disseminate their cultural productions. ALFINO, M. R. (1991) *Intellectual Property and Copyright Ethics*. *Business and Professional Ethics Journal*, 10.

³⁰ From a Law and Literature interdisciplinary approach, if one reads the various copyright statutes as a story, it appears that each reform in the law is actually the expression of a change in the society. FREDRIKSSON, M. (2005) *Copyright and the Story of the Author*. *MIT4: The Work of Stories*.

³¹ According to Lockean rhetoric, the copyright system can be justified on a labor-desert theory, according to which the proprietary rights conferred by copyright law are a deserved reward for the intellectual effort of authors (in other words, they are the natural entitlements to the fruits of their labor). CRAIG, C. S. J. (2002) Locke, Labour, and Limiting the Author's Right: A Warning against a Lockean Approach to Copyright Law. *Queen's Law Journal*, 28.

³² A theory of romantic authorship justifies copyright proprietary rights on the grounds that authors possess the original ideas embodied in their works because each work is the expression of the author's personality. AOKI, K. (1996) (Intellectual) Property and Sovereignty: Notes toward a Cultural Geography of Authorship. *Stanford Law Review*, 48.

³³ Most countries of continental Europe did not introduce a copyright system derived from the English model which was mainly based on economic considerations, but adopted instead an extensive system of authors' rights based on the romantic notion of original authorship, as a consequence of the fact that by the time the countries of continental Europe decided to introduce a copyright regime in their national legislations the copyright discourse based on natural rights was more advanced and more widely accepted. MATTHEWS, B. (1890) The Evolution of Copyright. *Political Science Quarterly*, 5.

³⁴ See the Berne Convention for the Protection of Literary and Artistic Works of 1886 (which requires copyright protection to be automatic, provides a minimum standards of copyright protection that each signatory country must implement in the national

From a strictly economic perspective, copyright law is a legal instrument whose function is to maximize the production and the distribution of works. As such, the copyright regime is a reaction to those problems which are likely to reduce incentives for authors to create and/or make their works available to the public. One such problem is the market failure resulting from information being a public good. This has traditionally been resolved by the law through the introduction of artificial scarcity by means of exclusive rights.³⁶

As a general rule, in fact, the value of any given resource is determined according to the utility it provides to society, which generally determines the price of that resource on the market. The problem with information is that it qualifies as an intangible asset which necessarily assumes the characteristics of a public good, in the sense that it is both non-rival and non-excludible.³⁷

Indeed, in view of its intangible nature, it is virtually impossible to exclude anyone from enjoying a particular piece of information. After it has been disclosed to the public, everyone can theoretically benefit from the consumption thereof. In particular, to the extent that they can consume information regardless of whether or not they have contributed to its costs, users are unlikely to reveal their actual willingness to pay for that particular piece of information but would rather attempt to free-ride on the contribution of others.³⁸ Moreover, while the costs of producing new information can be very high, information can be reproduced in

legislation, and establishes a system of equal national treatment for foreign works) whose provisions have later been for the most part endorsed by the TRIPs Agreement of 1994; the Universal Copyright Convention of 1952 (developed as an alternative to the Berne Convention for countries who did not agree with the minimum standards set up by the Berne Convention, but nowadays insignificant); the International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations of 1961 (which extends copyright protection to the creator of the physical embodiment of a work); the Geneva Phonograms Convention of 1971 (which deals with the problem of unauthorized duplication of phonograms); the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty of 1996 (which provides additional protection to copyright works as a result of the advent of Internet and the digital technologies).

³⁵ See in particular the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty of 1996, as implemented in the USA by the Digital Millennium Copyright Act of 1999 and in the European Community by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society.

³⁶ Public goods are defined by two characteristics: the inherent quality of non-rivalry (whenever the enjoyment of the good by an individual does not affect the enjoyment of the same good by others) and the contextual character of non-excludability (whenever it is impossible for an individual to exclude others from enjoying the good). Accordingly, while the former is a permanent characteristic of the good which cannot be altered, the latter is only a product of the current state of affairs. VARIAN, H. R. (1998) *Markets for Information Goods*. University of California, Berkeley, CA.

³⁷ While non-rivalry is an intrinsic feature of the goods, the quality of non-excludability depends on the context in which the goods are being consumed. A public good can therefore be transformed into a private good through the establishment of artificial excludability by legal or technological means. For more details on the characteristics of information as a public good, see *Ibid.*

³⁸ While producing information may sometimes be very costly and require significant initial investments, the costs of reproducing information are generally extremely low. Insofar as the producers are unable to exclude people from accessing and/or reproducing information, however, they will never be able to recoup their costs of production. Free-riding may therefore reduce the incentives for authors to create new works even when it would be socially valuable to do so. As a result of its intangible nature, information is therefore subject to the public good dilemma, and is thus likely to be under-produced in the absence of government intervention. For a more detailed overview on free-riding and intellectual property, see LEMLEY, M. A. (2005) *Property, Intellectual Property, and Free Riding*. *Texas Law Review*, 83.

no time and at virtually no cost. There are, therefore, no real incentives for anyone to purchase it from the original creator, rather than by somebody who, having had access to one copy, reproduces it and sells it at its marginal cost (or little above that cost).³⁹ Consequently, insofar as that the costs incurred in the production thereof cannot be recouped, the production of information is less likely to be economically viable.

Thus, to the extent that they qualify as a particular kind of information, creative works exhibit the two basic characteristics of a public good: they are non-excludable and non-rival in consumption. In order to achieve an optimal allocation of resources, the production and the exploitation of creative works must, therefore, be regulated. As an attempt to do so, the copyright regime attempted to achieve a balance between incentives for authors to create and public access to information.⁴⁰

On the one hand, in view of the non-excludable nature of information goods, there is the risk that, without an established system of rewards, authors will create a suboptimal quantity of works.⁴¹ This might result in a loss of welfare for society, as certain works may not be produced although it would be socially valuable to do so.⁴² Accordingly, in order to provide incentives for authors to produce a socially optimal quantity of works, copyright law introduces a property right in the expression of a work. From an economic standpoint, the goal

³⁹ A given piece of information may have different value to different parties. The market value of information goods will therefore depend on the extent to which the information is appraised by the complexity of players in the market. In particular, the price of the information asset will not be determined by its cost of reproduction (which will be inevitably equal zero), but to the utility it may provide to various market players. To the extent that no one is willing to acquire that particular piece of information, however, the asset is deemed to have no economic value. For more details, see Chapter 7 in REILLY, R. F. & SCHWEIHS, R. P. (1998) *Valuing intangible assets*, McGraw-Hill Professional.

⁴⁰ In order to resolve the problem of under production deriving from the non-excludability of information goods, the consumption of creative works must be regulated so as to ensure that sufficient incentives are available for authors to produce an optimal quantity of works. By restricting the exploitation of non-rival goods, however, a deadweight loss necessarily emerges given that certain consumers will be excluded from enjoying the works even if they would be willing to pay for the marginal cost of production. An efficient regulation must therefore establish a trade-off between maximizing the incentive to create (dynamic efficiency) and maximizing the benefits resulting from the creation of additional works (static efficiency). See LÉVÊQUE, F. & MÉNIÈRE, Y. (2004) *The Economics of Patents and Copyright*, Paris, The Berkeley Electronic Press.

⁴¹ If the production of information goods is exclusively regulated by the invisible hand of the market, creative works may only be produced up to a less than optimal amount, because people will be able to capture the benefits deriving from their consumption regardless of whether or not they are contributing to the production thereof. In fact, although the marginal cost of extending the consumption of a non-rival good to one additional individual is zero, a work will only be created if the returns which can be expected from the aggregated demand of the market are greater than the costs which must be incurred for the production of the work. However, if everyone can enjoy the whole variety of works which have been produced, it is in the interest of consumers to misrepresent their preferences and to free-ride on the contribution of others, so that, as a result, an insufficient amount of works will be produced. See OAKLAND, W. H. (1974) Public Goods, Perfect Competition, and Underproduction. *The Journal of Political Economy*, 82.

⁴² The production of information goods can be regarded as a prisoner's dilemma. Gordon illustrates this with an example concerning the choice of two producers who must each decide whether to create a new work or copy an existing work. The problem is that, if the players act so as to maximize their payoffs, they will be induced to free-ride on the contribution of others (by copying an existing work) without themselves providing any sort of contribution (by creating a new work). Eventually, all players might end up being worse-off than if they had coordinated their behaviors, because no work will be produced. For more details, see GORDON, W. J. (1992) Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property. *University of Dayton Law Review*, 17.

of the copyright regime is ultimately to convert information into an object of trade. Insofar as information can be turned into an information good, authors are given the opportunity to rely upon market mechanisms in order to obtain economic returns from their works. As it has been previously observed, information may be regarded as a quasi-public good, in that it is both non-rival and non-excludable. The legal regime can turn a quasi-public good into a private good by introducing artificially scarcity and/or legal excludability. Accordingly, by granting a series of exclusive rights in the expression of any original work of authorship, copyright law has turned a certain type of information into a private good, which can now be traded on most market institutions just as any other economic good.⁴³ Through the bundle of exclusive rights they have been endowed with, authors can exercise a certain amount of control over the commercial exploitation of their works, so as to eventually secure economic rewards for their creative endeavors.⁴⁴

On the other hand, copyright has to be limited to the extent necessary to ensure an optimal level of production and a widespread dissemination of works. The copyright regime creates in fact a situation of artificial scarcity, which might prevent the maximization of social welfare insofar as certain users will be excluded from enjoying a work even where the exploitation thereof would not impose additional costs on society.⁴⁵ In order to determine the optimal level of protection that should be granted under the copyright regime, it is thus necessary to perform an analysis upon the corresponding costs and benefits of any extension or reduction thereof. In particular, while a greater scope of protection is likely to increase the incentives for authors to create, it is likely to simultaneously increase the costs of creation for any author who would like to borrow on the expression of another, together with increasing the extent of welfare loss that is imposed on society as a result of monopoly pricing. Ideally, the copyright regime should strike a fair balance between the need to reward authors for their intellectual endeavors and the need to make a maximum number of works available to the public.⁴⁶ To achieve this outcome, copyright law must therefore introduce a number of limitations on the proprietary rights granted to every copyright owner in order to ensure the maximum availability of works to every member of society.⁴⁷ As a result, copyright protection has been limited in scope and duration. Although

⁴³ See, in particular, VARIAN, H. R. (1998) *Markets for Information Goods*. University of California, Berkeley, CA.

⁴⁴ In order to promote the creation of new works, creative endeavor is to be rewarded and authors must be compensated for the costs, time and efforts spent in the production of their works. The establishment of a monopoly (albeit limited) is therefore a necessary evil to ensure that a sufficient amount of creative works will be produced. See MACAULAY, T. B. (1841) A Speech in the House of Commons on the 5th of February 1841. IN YOUNG, G. M. (Ed.) *Macaulay, Prose and Poetry*. Harvard University Press

⁴⁵ In a situation of perfect competition, the price of a good equals its marginal costs and the good is produced up to the point where the demand meets the function of marginal costs (the socially efficient quantity). In a situation of monopoly, given a specific demand function, the monopolist will produce only to the point where marginal revenues equal marginal costs (the first order condition for profit maximization). The establishment of a monopoly right will therefore impose a deadweight loss on society whose magnitude depends on the difference between the sum of both producers and consumers' surplus in the two situations. For a more detailed analysis of the deadweight loss resulting from the introduction of a temporary monopoly within the copyright regime, see LANDES, W. M. & POSNER, R. A. (1989) *An Economic Analysis of Copyright Law*. *The Journal of Legal Studies*, 18.

⁴⁶ An attempt to determine the optimal scope of copyright protection from an utilitarian perspective can be found in *Ibid*.

⁴⁷ In order for copyright law to actually induce the production of an optimal quantity of works, the exclusive rights of the copyright regime have to be subject to a series of limitations. In particular, because creative works constitute both the input and the output of creative endeavor, the term of copyright protection should be confined to the point where the marginal benefits resulting from the

they have been granted with a series of exclusive rights over the expression of their works, authors are not entitled to arbitrarily prevent the unauthorized exploitation thereof. Moreover, after a certain period of time, a work will inevitably enter into the public domain and consequently become freely available to anyone.

Before identifying the function assumed by copyright law in the regulation of information, a broader overview of the copyright regime will be provided in order to determine (1) the extent to which different categories of works may qualify for protection under a variety of jurisdictions, and (2) the actual scope of copyright protection they may be granted with. Finally, some of the concerns regarding the application of copyright law in the digital environment will be addressed. Although it has been conceived for the physical world, the copyright regime should theoretically be structured so as to apply in the digital world without any major difficulty. Yet, in view of the different rules that govern the physical and the digital environment, the law may have to be considerably reformed to overcome the challenges posed by technological advances in the information society.

SECTION 1

COPYRIGHT BASICS

Broadly speaking, copyright law encourages the production of original works of authorship by providing authors with set of exclusive rights in the expression of their works - although the scope of these rights is limited in order for society to ultimately benefit from an increased production and dissemination of works.

The provisions of copyright law are however likely to differ from one jurisdiction to another. In particular, there are two main lines of argument may justify the formation of separate regimes. Principally found in countries with a civil law tradition, the regime of authors' rights is based on an individualist conception of the author who is believed to be naturally entitled to a proprietary right in every intellectual creation.⁴⁸ Conversely, the copyright regime, characteristic of most common law countries, is mainly justified on the grounds of economic efficiency. Since authors will only invest in the production of a work if they believe they

extended copyright protection are equal to the marginal costs required for the production of new works. See e.g. VARIAN, H. R. (2005) Copying and Copyright. *Journal of Economic Perspectives*, 19. Moreover, in the name of economic efficiency, the scope and the extent of copyright protection have to be restrained in order to ensure that certain exploitations of a work will not be undermined by any imperfection of the market. Whenever a socially valuable exploitation is likely to be prevented as a result of market failure (e.g. excessive transaction costs), the unauthorized exploitation of the work may thus nevertheless be allowed. See e.g. GORDON, W. J. (1982) Fair Use as Market Failure: A Structural and Economic Analysis of the "Betamax" Case and its Predecessors. *Columbia Law Review*, 82.

⁴⁸ France is the first country to have implemented an authors' right regime, first with the enactment of the Law of 1791, which introduced the exclusive right of representation, then with the Law of 1793, recognizing the exclusive right of reproduction to authors. The regime was justified on the grounds that the work of authorship is the fruit of the writer's thought; it is therefore "the most sacred, the most unassailable and the most personal of all the properties. [...] It is extremely just that the men who cultivate the field of thought enjoy some fruits from their work." LECHAPELIER, J. (1791) Reports to the revolutionary parliaments. *January 15*. Paris.

can receive appropriate returns from their investments, the set of exclusive rights granted by copyright law constitutes an additional incentive to create. Thus the ultimate objective of the law is not to promote the interests of the author but that of society as a whole.⁴⁹

As a territorial right, the copyright only subsists within the territory in which it has been granted.⁵⁰ The main step towards international harmonization was achieved in 1886 with the ratification of the Berne Convention for the protection of literary and artistic works. The Convention established minimum standards of protection, and introduced the principle of national treatment for all contracting parties, according to which every foreign work should be entitled to the same level of protection as any other domestic work.⁵¹ The Berne Convention has been subsequently endorsed by the Agreement on Trade Related Aspects of International Property of 1994 (the TRIPS Agreement), which mandates that all contracting parties comply with the most essential requirements of the Berne Convention. Later, with the worldwide deployment of the Internet network, the harmonization of the copyright system in different jurisdictions has become increasingly necessary. In 1996, two treaties were concluded at the World Intellectual Property Organization (WIPO) as an attempt to standardize the regulation of copyright and neighboring rights in the digital environment: the WIPO Copyright Treaty (WPT), dealing with the level of copyright protection granted to the authors of creative works, and the WIPO Performances and Phonograms Treaty (WPPT), mainly concerned with the neighboring rights of performers and producers of phonograms. Today, although a complete harmonization has not yet been achieved, the effective level of protection granted to original work of authorships has nonetheless become more uniform amongst countries.

As a general rule, copyright law protects the expression of any original work of authorship and is automatically secured upon creation.⁵² The standard of originality is however very low. In order to be eligible for copyright

⁴⁹ See, e.g. *Sony Corp. v. Universal City Studios, Inc.*, 464 U.S. 417, 430-31 nn. 11-12 (1984): Copyright law “is intended to motivate the creative activity of authors [...] by the provision of a special reward, and to allow the public access to the products of their genius after the limited period of exclusive control has expired.” *Fogerty v. Fantasy, Inc.*, 114 S. Ct. 1023, 1029 (1994): “Although intended to motivate the creative activity of authors and inventors by the provision of a special reward, [the exclusive rights] are limited in nature and must ultimately serve the public good.”

⁵⁰ Since the copyright regime is regulated on a strictly national basis, the copyright is a territorial right that does not extend beyond national territory. Copyright owners may only enjoy country specific rights and the protection they get is based on the law of the country where the protection is sought. See GOLDSTEIN, P. (2001) *International Copyright: Principles, Law, and Practice*, Oxford University Press.

⁵¹ Berne Convention article 5(1): “Authors shall enjoy, in respect of works for which they are protected under this Convention, in countries of the Union other than the country of origin, the rights which their respective laws do now or may hereafter grant to their nationals, as well as the rights specially granted by this Convention”

⁵² The Berne Convention (article 5(2)) stipulates that copyright protection applies automatically (no registration and no formalities are required in order to secure copyright protection) as soon as a work is created. It provides however no indications with regard to when a work is to be regarded as having been created (see article 2(2)). Some regimes consider that a work is created only when it has been fixated into a physical entity: e.g. USA, Canada, UK, and many other common law countries, whereas others do not consider the fixation of the work as a necessary requirement for creation: e.g. France, Germany, Sweden, Switzerland, Brazil, Japan and many other civil law countries (although they may require fixation for certain categories of works, e.g. artistic works in Japan, choreographic works in France).

protection, a work only needs to be regarded as an original creation resulting from the intellectual endeavor of the author. Hence, provided that it does not result from actual copying, any work whose content is substantially similar to that of another work might, nonetheless, be granted an independent copyright.⁵³

Protection is granted through set of are freely and independently alienable exclusive rights, which are originally owned by the author of the work (except in some rare situations). Before entering into details, it is necessary to first investigate the scope of these rights.

A. SCOPE OF PROTECTION

Fundamentally, the copyright can be described as two different bundles of rights: a series of exclusive rights through which authors can exercise a certain degree of control over the economic exploitation of their works, and a set of moral rights which are there to ensure that authorship is recognized and that exploitation of these works is not likely to cause prejudice to the personality or to the reputation of the author. In order for society to eventually benefit from these works, most of these rights have been limited not only in time, but also in scope.

In recent years, the copyright regime has been considerably affected by the deployment of the Internet network and by the increasing availability of digital content. On the one hand, the scope of exclusive rights has been extended to cover the new forms of exploitation that are possible with digital works. On the other hand, the scope of the copyright regime has been expanded to provide legal protection against the circumvention of technological measures designed to prevent the unauthorized exploitation of a copyright work.⁵⁴ The actual scope of protection in the digital environment is therefore much broader than the scope of copyright protection available in the physical world and is ever more likely to change according to future technological developments.

1. SUBJECT MATTER

As prescribed by the Berne Convention, copyright law should award protection to any artistic, literary, musical and dramatic work. These categories are extremely broad and can potentially include a large variety of

⁵³ Copyright law only protects against actual copying. As such, the production of a work that is identical or substantially similar to a copyright work is not actionable unless it can be proven or if there are sufficient grounds to believe that the allegedly infringing work has actually been derived from the copyright work. Independent creations are therefore not liable under copyright law, except if they are the result of unintentional copying. The reason is that (1) an independent creation does not involve any free-riding on the part of the author who has to incur the same costs as the author of the original work, and (2) the costs of making sure that a particular expression has not been made yet would be so high as to reduce the incentives for authors to create. See LANDES, W. M. & POSNER, R. A. (1989) An Economic Analysis of Copyright Law. *The Journal of Legal Studies*, 18.

⁵⁴ For more details on the way in which the law has been reformed in order to accommodate the new forms of exploitation and to support the deployment of technological measures of protection against the unauthorized use of a work, see *infra* Part I. Chapter 1: Copyright law. Section 2.A: Legislative Reforms.

works. Through time, copyright protection has thus been made available to an increasingly large variety of works. The rights of performers, phonogram producers and broadcasting organizations have become part of copyright regime as a result of the Rome Convention of 1961,⁵⁵ computer software has become eligible for protection as a literary work,⁵⁶ semiconductors and integrated circuits may sometimes qualify for protection under a sui-generis regime,⁵⁷ and, in Europe, additional sui-generis rights have been introduced for the protection of unoriginal databases.⁵⁸

Conversely, in most jurisdictions, certain categories of works, such as titles, names, and short phrases, as well as governmental works in general, may not be eligible for protection.⁵⁹ Similarly, ideas, procedures, principles and discoveries are automatically excluded from copyright protection, as is any work which merely consists of

⁵⁵ The Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (1961) grants performers with the exclusive right to broadcast and to communicate their live performance to the public, to record it for the first time, as well as to reproduce the recording whenever the original fixation was made without their consent or if the reproduction is made for purposes different from those for which they gave their consent; producers of phonograms with the right to authorize or prohibit the direct or indirect reproduction of their phonograms; and broadcasting organizations with the right to authorize or prohibit the rebroadcasting, the fixation of their broadcasts and the reproduction of their broadcasts, as well as the communication to the public of their television broadcasts if such communication is made in places accessible to the public against payment of an entrance fee. In addition, the protection of performers and producers of phonograms has been endorsed by the TRIPs Agreement (article 14) and extended into the digital environment through the WIPO Performances and Phonograms Treaty of 1996.

⁵⁶ See article 10(1) of the TRIPs Agreement: "Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention;" article 4 of the WIPO Copyright Treaty: "Computer programs are protected as literary works within the meaning of Article 2 of the Berne Convention. Such protection applies to computer programs, whatever may be the mode or form of their expression;" the European Directive 91/250/EC on the legal protection of software and section 101 of the US Copyright Act (as amended 1980).

⁵⁷ Semiconductors and electronic circuit diagrams are protected differently in different jurisdictions. In the USA, the Semiconductor Chip Protection Act of 1984 created a specific form of intellectual property right which may be regarded as a hybrid between patent and copyright protection. In Europe, the Directive 87/54/EEC on the Legal Protection of Semiconductor Products was enacted in order to establish an uniform system of protection for semiconductors and microchips, but the directive has been implemented in different manners in the national legislations of member states: the majority of countries introduced a sui-generis right subject to registration, whereas the UK, Ireland and Belgium adopted a copyright approach, based on the unregistered design right. In addition to the divergent models of protection, the term of protection varies from one country to another. More detail on the European protection of semiconductors at: HOEREN, T. (1991) Chip protection in Europe. IN MEIJBOOM, A. & PRINS, C. (Eds.) *The law of information technology in Europe*. Amsterdam.

⁵⁸ While any original compilation of data is protected under copyright law with regard to its structure, the data that it incorporates is not, as such, protected under the law. Yet, as a result of the European Directive 96/9/EC on the legal protection of databases, a sui-generis right has been introduced into the law in order to protect the structure and the content of unoriginal compilations or databases whose production has required a substantial investment of time, money and effort.

⁵⁹ In order to be protected by copyright law, a work must involve a minimum amount of authorship originating from the author. Names, titles, and other short phrases are generally believed not to be sufficiently substantial to be awarded copyright protection as such. Besides, according to the Berne Convention article 2(4): "It shall be a matter for legislation in the countries of the Union to determine the protection to be granted to official texts of a legislative, administrative and legal nature, and to official translations of such texts." e.g. in the US copyright protection does not extend to works of the US Government, which can therefore be freely reproduced, distributed, adapted and/or publicly displayed in the US (although they may be nevertheless protected abroad).

common place data or information.⁶⁰ The idea/expression dichotomy is a fundamental principle of copyright law, which does not protect any of the ideas or facts underlying a work but only the manner in which they have been expressed. As a result, anyone is entitled to use the unprotected elements of a work (facts, ideas, and other materials from the public domain) as long as they are expressed in a different way. This provides an adequate protection to the expression of a work, while simultaneously allowing for the free flow of information. However, it is sometimes difficult to precisely to differentiate between expression and idea.⁶¹

2. ECONOMIC RIGHTS

Copyright is a negative right. It prevents people from doing something they would have otherwise been allowed to, rather than giving right holders the right to do something they could have otherwise not done.

The bundle of exclusive rights constitutes the main form of economic exploitation of a work. The exclusive right of reproduction⁶² is perhaps the most important one, as it prevents the direct or indirect reproduction of a work, in part or as a whole, and in any manner or form. The exclusive right of distribution precludes the sale or the dissemination of any original work of authorship that qualifies for copyright protection, or any copies thereof.⁶³ The right has traditionally been subject to the principle of exhaustion, according to which the right holder can no longer exercise control over the distribution of the copies which have been legitimately distributed to the public. This principle is however not applicable in the digital environment, where the copies of a work do no longer qualify as tangible objects.⁶⁴ Similarly, the rental right, which regulates the renting of

⁶⁰ See e.g. article 9(2) of the TRIPs Agreement: "Copyright protection shall extend to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such" as well as section 102(b) of the US Copyright Act: "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." See article 2(8) of the Berne Convention: "The protection of this Convention shall not apply to news of the day or to miscellaneous facts having the character of mere items of press information."

⁶¹ See: SAMUELS, E. (1989) The idea-expression dichotomy in copyright law. *Tennessee Law Review*, 56.

⁶² Berne Convention for the Protection of Literary and Artistic works, Art. 9(1): "Authors of literary and artistic works protected by this Convention shall have the exclusive right of authorizing the reproduction of these works, in any manner or form."

⁶³ WIPO Copyright Treaty, Art. 6(1): "Authors of literary and artistic works shall enjoy the exclusive right of authorizing the making available to the public of the original and copies of their works through sale or other transfer of ownership."

⁶⁴ WIPO Copyright Treaty, Agreed statements concerning Articles 6 and 7: "As used in these Articles, the expressions "copies" and "original and copies" being subject to the right of distribution [...] refer exclusively to fixed copies that can be put into circulation as tangible objects." See also the preamble 29 of the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society: "The question of exhaustion does not arise in the case of services and online services in particular. This also applies with regard to a material copy of a work or other subject matter made by a user of such a service with the consent of the right holder. Therefore, the same applies to rental and lending of the original and copies of works or other subject-matter which are services by nature. Unlike CD-ROM or CD-I, where the intellectual property is incorporated in a material medium, namely an item of goods, every online service is in fact an act which should be subject to authorization where the copyright or related right so provides" as well as US Copyright Office Report on the DMCA Section 104 concerning the non-implementation of the Digital First Sale Doctrine.

computer software, cinematographic works and phonograms for commercial purposes,⁶⁵ is itself not subject to exhaustion. In addition, the copyright includes the exclusive right of communication to the public, which regulates the extent to which a work can be performed or displayed to the public.⁶⁶ This also includes the right of making the work available to the members of the public in such a way that it can be accessed at the time and place individually chosen by them.⁶⁷ Finally, right holders are granted the exclusive right of adaptation, which prohibits the making of derivative works displaying a substantial amount of similarity with the original works,⁶⁸ regardless of the fact that the derivative works may exhibit a sufficient amount of originality so as to qualify for copyright protection themselves.⁶⁹

In order to obtain monetary or non-monetary returns, the copyright owner can license one or more of these exclusive right to a variety third parties, either in whole or in part, under particular terms and conditions that precisely stipulate the manner and the extent to which the work can be legitimately exploited.

3. MORAL RIGHTS

As opposed to the exclusive rights, concerned with the economic value of a work, moral rights are for the most part concerned with the manner in which a work reflects the personality of the author. As a general rule, moral rights are assigned to the author of a work and are generally regarded as being inalienable, for all the

⁶⁵See Trips Agreement Article 11; WIPO Copyright Treaty, Art. 7(1): “Authors of (i) computer programs;(ii) cinematographic works; and (iii) works embodied in phonograms, as determined in the national law of Contracting Parties, shall enjoy the exclusive right of authorizing commercial rental to the public of the originals or copies of their works.”

⁶⁶ See, e.g. Berne Convention Article 11(1):Right of public performance and of communication to the public of a performance; Article 11bis(1):Broadcasting and other wireless communications, public communication of broadcast by wire or rebroadcast, public communication of broadcast by loudspeaker or analogous instruments; Article 11ter(1): Right of public recitation and of communication to the public of a recitation; Article 14(1):Cinematographic adaptation and reproduction; distribution; public performance and public communication by wire of works thus adapted or reproduced.

⁶⁷ WIPO Copyright Treaty, Art. 8: “authors of literary and artistic works shall enjoy the exclusive right of authorizing any communication to the public of their works, by wire or wireless means, including the making available to the public of their works in such a way that members of the public may access these works from a place and at a time individually chosen by them.”

⁶⁸ A work may be regarded as a derivative work whenever it is based on another work, and the resulting work is substantially similar with the original work. Substantial similarity, however, does not necessarily involves literal copying, but may also arise whenever the structure of a work is copied so that the resulting work include non-literal similarities, e.g. as a result of translations (Berne Convention article 8), adaptations (Berne Convention article 14(2)), conversions, etc). See REBIKOFF, S. (2001) Restructuring The Test For Copyright Infringement In Relation To Literary and Dramatic Plots. *Melbourne University Law Review*, 12.(with regards to non-literal infringement in literary and dramatic works) and VELASCO, J. (1994) The Copyrightability of Nonliteral Elements of Computer Programs. *Columbia Law Review*, 94.(relating to non-literal infringement in computer software).

⁶⁹ Berne Convention Article 2(3): “Translations, adaptations, arrangements of music and other alterations of a literary or artistic work shall be protected as original works without prejudice to the copyright in the original work.”

duration of the copyright and beyond. Deeply rooted into the national conceptions of authorship, the regime of moral rights is therefore likely to significantly differ from one jurisdiction to another.⁷⁰

The moral right of attribution is probably the most widely recognized. It has been expressly endorsed by the Berne Convention⁷¹ and has therefore been implemented in virtually every jurisdiction. It generally consists of the right to be identified as the author of a work, the right of not being falsely attributed as the author of another work, as well as the right for the author of a work to remain anonymous. The moral right of integrity, also endorsed by the Berne Convention,⁷² provides authors with the right to object to any mutilation, distortion or other modifications of a works which is likely to cause prejudice to their honor or reputation. Though not expressly provided for in the Berne Convention, the moral right of first publication is, nonetheless, acknowledged in most authors' rights regimes of continental Europe.⁷³ The right basically protects authors against the premature disclosure of their works by giving them the right to decide upon the date and the location for the first publication thereof. Finally, a number of jurisdictions also recognize the moral right of withdrawal,⁷⁴ according to which authors are entitled to prevent the further reproduction and dissemination of their works, as well as to withdraw any copy that has been made available on the market, in exchange for providing adequate monetary compensation to the owners of the rights in these works.

B. LIMITS OF PROTECTION

Copyright is not an absolute right. The law seeks to create a balance between the interests of rights holders in protecting their works against unauthorized exploitation and the interests of the community in accessing and

⁷⁰ Even within the European Community, there has been no harmonization of the national moral rights regimes. The duration is quite different from one country to another. Moral rights may last for an indefinite period of time (e.g. in France), or they may be limited to the copyright term (70 years post mortem) or to the life of the author. The alienability thereof is also subject to debate. See e.g. Article L. 121-1 of the French Code de la propriété intellectuelle, which represent one of a fundamental implementation of the doctrine of moral rights: "The author shall enjoy the right to the respect for his name, his authorship and his work. This right shall be attached to his person. It shall be perpetual, inalienable, and imprescriptible." Instead, in most of the common law countries which actually implemented a moral right regime (e.g. Canada), moral rights can generally be waived contractually.

⁷¹ Berne Convention Article 6bis: "Independently of the author's economic rights, and even after the transfer of the said rights, the author shall have the right to claim authorship of the work [...]." The right has been recognized in almost every jurisdiction, although it is sometimes subject to particular requirements or formalities. See e.g. in the UK, where the moral right of paternity is recognized by statute but does not arise unless it has first been asserted by the author of the work (section 78 of the Copyright, Designs and Patents Act).

⁷² Berne Convention Article 6bis: "[...] and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honor or reputation."

⁷³ The right of disclosure is generally recognized in most civil law jurisdictions. See, e.g. the "droit de divulgation" in France (Article L. 121-2 of the French Code de la propriété intellectuelle). The right is also recognized in the copyright law of Australia.

⁷⁴ The right of withdrawal is less generally recognized. In Europe it has only been implemented in France, Italy, Spain, Portugal and Germany, and to a certain extent in Belgium. See e.g. the "droit de retrait" in France (Article L. 121-4 of the French Code de la propriété intellectuelle). The right is also recognized in the copyright law of Australia.

exploiting these works for a variety of legitimate purposes. Every national jurisdiction has therefore implemented a number of exemptions into the copyright regime, to limit the range of application of these rights in terms of duration and scope.

The most important limitation is that copyright may only last for a limited period of time. The Berne Convention stipulates that it may not last for less than 50 years after the death of the author⁷⁵ - although the Convention allows for longer or shorter terms of protection for particular types of work.⁷⁶ Most countries have adopted a standard copyright term of 70 years after the death of the author.⁷⁷

With regard to the scope of the rights, although the three-step-test of the Berne Convention⁷⁸ has been widely embraced at the international level, the actual implementation of copyright limitations in the different jurisdictions is far from being uniform. Many common law countries have developed a series of general principles that stipulate the condition under which an alleged act of copyright infringement may be nevertheless regarded as fair,⁷⁹ whereas the majority of countries with a civil law tradition opted for the establishment of a well-defined regime of exemptions with an exhaustive list of permitted acts. Moreover, it has to be noted that, after the introduction of a particular regime of protection against the circumvention of technological measures specifically designed to prevent the access to and the unauthorized exploitation of a

⁷⁵ Berne Convention, article 7(1): “The term of protection granted by this Convention shall be the life of the author and fifty years after his death” and article 7(6): “The countries of the Union may grant a term of protection in excess of those provided by the preceding paragraphs.”

⁷⁶ Article 7 of the Berne Convention establishes the minimal term of protection of 50 years after the death of the author as a default, but also provides for possible derogations with regards to cinematographic works, photographic works, works of applied art, as well as anonymous and pseudonymous works.

⁷⁷ See e.g. Articles 1, 2 and 3 of the Directive 93/98/EEC harmonizing the term of protection of copyright and certain related rights in Europe; and the Copyright Term Extension Act (CTEA) of 1998 in the USA, which extended the default term of protection from 50 years to 70 years after the death of the author.

⁷⁸ Article 9(2) of the Berne Convention for the Protection of Literary and Artistic works, although originally exclusively referring to the right of reproduction, has led to the establishment of a the “three-step-test” according to which it is possible to introduce specific limitations and exceptions to the exclusive rights granted by the copyright regime, provided that they are (1) confined to certain special cases (2) not in conflict with a normal exploitation of the work and (3) of no unreasonably prejudice to the legitimate interests of the author. It has been endorsed with regard to any category of works by the TRIPs Agreement (article 13), the WIPO Copyright Treaty article 10, the WIPO Performers and Phonograms Treaty article 16, and a number of European Directives.

⁷⁹ Common law countries have implemented a generalized model of limitations based on principles of fair use/dealing. See, e.g. the U.S Copyright Act, section 107, according to which, in order to determine whether a specific use may qualify as fair, it is necessary to consider (a) the purpose and character of the use, (b) the nature of the copyrighted work, (c) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (d) the effect of the use upon the potential market of the copyright work), three of which have been imported into the Hong Kong Copyright law at section 38(3). In other common law countries, such as the UK, Canada and Australia, fair dealing principles have first been established by the courts at common law and have been later incorporated as specific provisions into the Statute.

work,⁸⁰ users dealing with technologically protected works in the digital environment may not avail themselves of the same level of indemnities as in the physical environment.⁸¹

Finally, an important limitation relates to the exclusive right of distribution, which, according to the principle of exhaustion, will be exhausted after the right has been exercised for the first time with regard to a particular copy of the work and with the consent of the copyright owner. While the exhaustion of rights may occur at national, regional or international level,⁸² the doctrine has however been expressly excluded from the digital environment.⁸³

⁸⁰ The anti-circumvention provisions of copyright law prohibit the circumvention of technological measures for the protection of copyright works as well as the production and the distribution of circumventing devices (see WIPO Copyright Treaty, articles 11, 12 and WIPO Performances and Phonograms Treaty, articles 18, 19; as implemented in the European Community by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society (the Information Society Directive), articles 6, 7; and as implemented in the United States by The Digital Millennium Copyright Act of 1998, section 1201. For more details, see *infra* Part I. Chapter 1: Copyright law. Section 2.A: Legislative reforms.

⁸¹ Different regimes of exemptions have been introduced with regard to technologically protected copyright works (see WIPO Copyright Treaty, article 10 and WIPO Performances and Phonograms Treaty, article 16; as implemented in the European Community by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society article 5, which proposes one mandatory exemption together with a list of optional limitations that the member states can implement in their national legislation, subject to the qualification of article 6(4) according to which no measures needs to be taken to ensure that the exemptions are made available to the users whenever voluntary measures such as private agreements have been undertaken between right holders and the other parties concerned; and as implemented in the United States by the DMCA section 1201(d) to 1201(i), which establishes a regime of limitations much less flexible than the system resulting from the application of the fair use doctrine of the US Copyright Act of 1976, 17 U.S.C. § 107

⁸² According to national exhaustion, the right of distribution is exhausted only within the national territories into which it has been previously exercised, whereas, with regional exhaustion, the rights is exhausted into an entire territorial area (e.g. the European Community). International exhaustion, finally, stipulates that the right is to be exhausted as soon as it has been exercised once. In Europe, in line with article 4 of the Directive EC/2001/29 on the harmonization of certain aspects of copyright and related rights in the information society, article 4 of the Directive EC/91/250 on the legal protection of computer programs, and article 5(c) of the Directive EC/96/9 on the legal protection of databases, the members of the European Union have implemented a regime of regional exhaustion within the area of the European Community. Japan and Austria have instead implemented a regime of international exhaustion.

⁸³ WIPO Copyright Treaty, Agreed statements concerning Articles 6 and 7: “As used in these Articles, the expressions “copies” and “original and copies” being subject to the right of distribution [...] refer exclusively to fixed copies that can be put into circulation as tangible objects.”

DIGITAL CHALLENGES

Copyright law is supposed to apply equally both in the physical and the digital world. Yet, the advent of Internet and digital technologies created new opportunities for authors to produce, process or manipulate information and for users to access, consume or exploit the resulting pieces of information - a result of which, traditional equilibrium of the copyright regime has been disrupted

As such, the copyright regime should be reformed in such a way as to take advantage of the new opportunities offered by Internet and digital technologies, in order to contribute to the successful development of the market for information goods while allowing for a maximum number of works to be made available to society. Legislative reforms have therefore been necessary, on the one hand, to accommodate the provisions of the copyright regime to the digital world, and, on the other hand, to endorse the operation of private mechanisms of self-help whenever they are likely to assist copyright law in fulfilling its function in the digital environment.

The challenge was to reproduce, in the digital environment, a similar regime to the one currently in place in the physical world. Most of the legislative reforms have therefore been implemented with the intention of restoring the original status quo previously established in the physical world. Yet, considering the different contexts in which they are intended to apply, certain provisions of the copyright regime have been drastically reformed in order to provide a similar level of protection in a world where the reproduction of content can be achieved in no time and at virtually no cost and the dissemination thereof can be performed on a global scale.⁸⁴ This resulted into the emergence of an alternative copyright regime for digital works whose protection has been extended far beyond the actual scope of protection that exists in the physical world.

The question is whether it is efficient to reintroduce a scheme which replicates the rules governing the physical world into the digital environment. Perhaps, it would be more appropriate to establish an alternative regime for digital works, which also accounts for the various benefits that the digital environment may offer. In particular, to the extent that certain provisions of the copyright regime may eventually become obsolete as a result of technological advances, urging the law to conform with the new principles governing the digital

⁸⁴ Copyright infringement is a function of (1) the benefits deriving from an infringing activity and (2) the costs of infringement (namely, the costs incurred in performing the infringing activity plus the risks of being caught and punished). On the one hand, in the digital environment, copyright infringement is made particularly easy and convenient: users have become information providers, the costs of copyright infringement have been drastically reduced, the quality of infringing copies has significantly increased, and the risks of being caught have dropped considerably. See LEE, G. B. (1996) Addressing Anonymous Messages in Cyberspace. *Harvard Journal of Computer-Mediated Communication*, 2. Besides, the public is generally uneducated about copyright law and does not necessarily regard the illegitimate reproduction and dissemination of digital content as a criminal activity. See LITMAN, J. (1994) The Exclusive Right to Read. *Cardozo Arts & Entertainment Law Journal*, 13. On the other hand, copyright enforcement on the Internet has become particularly difficult, and, as a result of network and media convergence, some provisions of copyright law may have become somewhat obsolete in the digital environment. See DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press. Finally, the discrepancies existing within the different national copyright systems, combined with the international scope of the Internet which does not take account of national boundaries, may pose a series of challenges to the international resolution of copyright disputes. See GOLDSTEIN, P. (2001) *International Copyright: Principles, Law, and Practice*, Oxford University Press.

environment is therefore likely to be a more sensible approach than attempting to restore the former status quo by forcing the digital environment to comply with the rules of the physical world. A proper legislative reform should not necessarily attempt to preserve the legislative framework pertaining to the physical world, but should instead account for the new opportunities offered by a new medium whose flexibility and adaptability may allow for the establishment of an alternative regime capable of resolving the problems inherent to the current copyright regime, while preserving the interests of every stakeholder involved.

A. LEGISLATIVE REFORMS

In order to protect the rights of copyright owners and to ensure the long-term viability of the copyright regime in the digital environment, copyright law has been reformed to better comply with the distinctive features of the new environment.

In order to reduce the level of infringement resulting from the immediate reproduction and global dissemination of digital content, a series of technological measures of protection have been developed with the intention to restrict the access to and to prevent the reproduction of digital works. Yet, however sophisticated the technology may be, there is always the risk that an effective technological measure can be circumvented by a malicious user, who may subsequently be tempted to publicly disclose the procedure and/or to disseminate the technological means necessary to perform the circumvention on the Internet for anyone else to benefit from it.

The legislative solution has been to expand upon the scope of the copyright regime by providing an additional layer of protection to any technological measure of protection, as well as any metadata or other information incorporated into a copyright work and necessary for the correct operation of DRM systems.

In particular the WIPO Copyright Treaty (WCT) of 1996 is perhaps the most relevant piece of legislation that has been enacted for the purposes of adjusting the provisions of the copyright regime to the digital world. As a matter of fact, the WCT has explicitly endorsed the deployment of DRM systems. On the one hand, it has extended the scope of copyright protection to certain technological measures intended to restrict the access to or the usage of copyright works.⁸⁵ On the other hand, the WCT has sanctioned the removal or alteration of any information incorporated into a copyright work and necessary for the correct operation of DRM systems, as well as the mere dissemination of copies whose information has been previously tampered with.⁸⁶ The

⁸⁵ The WIPO Copyright Treaty (WCT), adopted in 1996 in Geneva, has introduced an additional layer of protection against the circumvention of particular technological measures of protection. See article 11: "Contracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with the exercise of their rights under this Treaty or the Berne Convention and that restrict acts, in respect of their works, which are not authorized by the authors concerned or permitted by law" as implemented in the USA by the Digital Millennium Copyright Act of 1999, section 1201, and in the European Community by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society, article 6.

⁸⁶ See article 12(1) of the WIPO Copyright Treaty: "Contracting Parties shall provide adequate and effective legal remedies against any person knowingly performing any of the following acts knowing [...] that it will induce, enable, facilitate or conceal an infringement of any right covered by this Treaty or the Berne Convention: (i) to remove or alter any electronic rights management

provisions of the Treaty have been ratified by a large number of countries, including the US through the Digital Millennium Copyright Act, and the EU by way of the European Directive 2001/29/EC on the Information Society. Both introduced a similar set of provisions concerning the prohibition against the circumvention of technological measures of protection and the alteration of digital rights information, but also made it a punishable offense to produce, distribute or even only to possess any kind of circumvention device.⁸⁷

More precisely, as the WCT called for the introduction of adequate legal protection against the circumvention of any effective technological measure employed for the protection of copyright works,⁸⁸ the Treaty gave no indication of whether circumvention is to be prohibited only to the extent that it would lead to copyright infringement or whether it should be categorically forbidden regardless of the purpose for which it has been performed.

In the USA, the provisions of the WCT have been implemented through the Digital Millennium Copyright Act (DMCA), which provides for the criminalization of any act of circumvention carried out against technological measures that effectively control the access to a copyright work.⁸⁹ The DMCA thus established a strict liability regime, where the circumvention of any device restricting the access to a copyright work is regarded as a criminal activity, regardless of whether circumvention has been achieved for the purpose of copyright infringement or not.⁹⁰ Only a specific list of exceptions has been introduced in order to specify the circumstances in which the circumvention of a technological measure would be considered legitimate,⁹¹

information without authority; (ii) to distribute, import for distribution, broadcast or communicate to the public, without authority, works or copies of works knowing that electronic rights management information has been removed or altered without authority.”

⁸⁷ See, in particular, the provisions of the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society (the Information Society Directive), articles 6, 7; and of the provisions of the Digital Millennium Copyright Act of 1998, section 1201.

⁸⁸ See article 11 of the WIPO Copyright Treaty: “Contracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with the exercise of their rights under this Treaty or the Berne Convention and that restrict acts, in respect of their works, which are not authorized by the authors concerned or permitted by law.”

⁸⁹ See section 1201 of the Digital Millennium Copyright Act, subsection a(1): “No person shall circumvent a technological measure that effectively controls access to a work protected under this title” and subsection a(3): “a technological measure effectively controls access to a work if the measure, in the ordinary course of its operation, requires the application of information, or a process or a treatment, with the authority of the copyright owner, to gain access to the work.”

⁹⁰ The circumvention of a technological measure for the sole purpose of exploiting a work in such a way that would not amount to copyright infringement (e.g. according to the regime of copyright limitations or fair use), would not provide any cause of action for a claim of copyright infringement, but the liability resulting from the circumvention of the technological measure of protection would subsist.

⁹¹ See section 1201 of the Digital Millennium Copyright Act, which stipulates an autonomous regime of exceptions allowing for the circumvention of technological measures in a few restricted circumstances (section 1201 subsections d: Exemption for Nonprofit Libraries, Archives, and Educational Institutions; e: Law Enforcement, Intelligence, and Other Government Activities; f: Reverse Engineering; g: Encryption Research; h: Exceptions Regarding Minors; i: Protection of Personally Identifying Information; j: Security Testing), resulting in the creation of a different regime of exceptions for copyright works protected by technological measures as opposed to their non-protected counterparts.

however, since the DMCA expressly prohibits the production and the distribution of any technology or device primarily designed to facilitate the circumvention of technological measure of protection,⁹² any legitimate act of circumvention may not be achieved unless users are capable of obtaining the information necessary to circumvent the technological protection on their own.

In the European Community, the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society imposes an obligation on every member state to implement an adequate level of protection against the deliberate circumvention of any effective technological measure of protection,⁹³ along with the production and the distribution of any technology or device that may facilitate the circumvention of these technological measures⁹⁴ - but only where this constitutes the primary purpose for which it has been designed.⁹⁵ This notwithstanding, the Directive stipulates that users shall nevertheless be entitled to benefit from the legitimate exploitation of a work, as specified within the national regime of exemptions,⁹⁶ but only on the condition that there exist no voluntary measures taken by the copyright owner.⁹⁷

⁹² See section 1201 of the Digital Millennium Copyright Act, subsection a(1): “No person shall manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that (a) is primarily designed or produced for the purpose of circumventing protection afforded by a technological measure that effectively protects a right of a copyright owner [and](b) has only limited commercially significant purpose or use other than to circumvent protection afforded by a technological measure that effectively protects a right of a copyright owner.”

⁹³ See Article 6(1) of the European Directive 2001/29/EC: “Member States shall provide adequate legal protection against the circumvention of any effective technological measures, which the person concerned carries out in the knowledge, or with reasonable grounds to know, that he or she is pursuing that objective.”

⁹⁴ See Article 6(2) of the European Directive 2001/29/EC: “Member States shall provide adequate legal protection against the manufacture, import, distribution, sale, rental, advertisement for sale or rental, or possession for commercial purposes of devices, products or components or the provision of services which: (a) are promoted, advertised or marketed for the purpose of circumvention of, or (b) have only a limited commercially significant purpose or use other than to circumvent, or (c) are primarily designed, produced, adapted or performed for the purpose of enabling or facilitating the circumvention of any effective technological measures.”

⁹⁵ See recital 48 of the European Directive 2001/29/EC: “Legal protection [against provision of devices and products or services for the circumvention of effective technological measures] should respect proportionality and should not prohibit those devices or activities which have a commercially significant purpose or use other than to circumvent the technical protection.”

⁹⁶ The European Directive 2001/29/EC has attempted to harmonize the regime of copyright exemptions of the different member states. It established one mandatory exemption with regard to temporary acts of reproduction that are an integral and essential part of a technological process (article 5(1)) and introduced an exhaustive list of possible exemptions that member states may or may not implement (articles 5(2) and 5(3)), with the possibility of maintaining existing exceptions only in cases of minor importance that only concern analogue uses and do not affect the free circulation of goods and services within the European Community (article 5(3)(o)). The Directive has however failed to achieve an adequate harmonization, since, in view of the high level of discretion that has been left to the national legislators, member states have generally maintained their earlier system of exemptions.

⁹⁷ See article 6(4) of the European Directive 2001/29/EC (paragraph 1): “In the absence of voluntary measures taken by right holders, including agreements between right holders and other parties concerned, Member States shall take appropriate measures to ensure that right holders make available to the beneficiary of an exception or limitation provided for in national law [...] the means of benefiting from that exception or limitation, to the extent necessary to benefit from that exception or limitation and where that beneficiary has legal access to the protected work or subject-matter concerned.”

In the digital environment, therefore, contractual agreements between users and right holders have been given preference over statutory limitations,⁹⁸ and only in the absence of the former are member states entitled to intervene in order to give users the possibility to exercise their rights.

Additionally, in order to prevent the circumvention of DRM systems, the WCT called for the implementation of an additional layer of protection against the unauthorized manipulation of rights management information (defined as any information incorporated into the copy of a copyright work, capable of identifying the work, the copyright owner and/or the terms and conditions for the exploitation of the work)⁹⁹ through the introduction of effective legal remedies against anyone deliberately removing or altering rights management information or knowingly disseminating a work whose rights management information has been illegitimately tampered with.¹⁰⁰

As a result of the legislative reforms introduced by the WIPO Copyright Treaty, copyright works are nowadays subject to three layers of protection: the legal protection provided by copyright law, the technological protection provided by TPMs, and the additional legal protection granted to the technological measures of protection.

Yet, although originally conceived in order to protect the interests of right holders against the pervasive practice of copyright infringement that has been emerging on the Internet, the legal protection of technological measures of protection may actually have a number of unintended consequences, as the law may ultimately safeguard the interests of right holders at the expense of end-users' interests.¹⁰¹ In so far as the access to or the usage of a work is prevented by technological measures of protection, any act of circumvention will amount to a violation of copyright law, even if circumvention was necessary to perform an act that would not, as such, amount to copyright infringement. The result is that the scope of the exclusive rights granted under the copyright regime could theoretically be extended to any form of exploitation or any type of information. Indeed, while the anti-circumvention regime only applies to technological measures used for the protection of copyright works, it becomes possible for right holders to control the access and use of information regardless

⁹⁸ See article 6(4) of the European Directive 2001/29/EC (paragraph 4): "The provisions of the first and second subparagraphs shall not apply to works or other subject-matter made available to the public on agreed contractual terms in such a way that members of the public may access them from a place and at a time individually chosen by them."

⁹⁹ See article 12(2) of the WIPO Copyright Treaty: "rights management information" means information which identifies the work, the author of the work, the owner of any right in the work, or information about the terms and conditions of use of the work, and any numbers or codes that represent such information, when any of these items of information is attached to a copy of a work or appears in connection with the communication of a work to the public."

¹⁰⁰ See article 12(1) of the WIPO Copyright Treaty: "Contracting Parties shall provide adequate and effective legal remedies against any person knowingly performing any of the following acts knowing [...] that it will induce, enable, facilitate or conceal an infringement of any right covered by this Treaty or the Berne Convention: (i) to remove or alter any electronic rights management information without authority; (ii) to distribute, import for distribution, broadcast or communicate to the public, without authority, works or copies of works knowing that electronic rights management information has been removed or altered without authority."

¹⁰¹ A large collection of reported cases concerning the negative impact of the anti-circumvention provisions of the Digital Millennium Copyright Act on a number of important public policy prerogatives can be found in: EFF (2006) Unintended Consequences: Seven Years under the DMCA. Electronic Frontier Foundation.

of whether such information is eligible for copyright protection. The owners of the copyright in a work become thus able control not only the original expression of the work but also any public domain information included therein.¹⁰²

In the digital environment, therefore, the copyright balance established by the first layer of protection has been superseded by the extra layer of protection granted to technological measures¹⁰³ and the basic freedoms that end-users have been granted with into the physical environment may thus no longer be preserved in the digital environment.¹⁰⁴ Technological measures of protection or digital right management system applied to a copyright work provide copyright owners with absolute control over the access to and/or the exploitation of their works. The terms and conditions of the license under which a work has been released can be technologically enforced by the means of technological measures which are in turn legally enforced by the anti-circumvention laws, regardless of whether or not the provisions of the license are compatible with copyright law and irrespectively of the fact that particular acts of exploitation might actually fall beyond the scope of the copyright regime.¹⁰⁵

By providing an additional layer of protection to any technological measure aiming at re-establishing the rival qualities of a work into the digital environment, the legislative reforms which have been adopted so far have essentially been aimed at ensuring that information goods are made private both in the physical and in the digital environment. Yet, these reforms may have gone too far. The anti-circumvention regime can theoretically be used not only to prevent unauthorized exploitations amounting to copyright infringement, but also to obstruct legitimate activities permitted under the copyright regime.¹⁰⁶ To date, the legal protection

¹⁰² For a more detailed overview on how the laws against the circumvention of technological measures of protection may have a negative effect on the public domain, see e.g. ELKIN-KOREN, N. (2001) The Privatization of Information Policy. *Ethics and Information Technology*, 2.

¹⁰³ See e.g. Niva Elkin-Koren, arguing that by weakening the enforceability of copyright law, the digital environment has promoted the development of another type of regulation (regulation by code) that distinguishes itself from public regulation (copyright law) and private regulation (contract law) by the fact that it is self-enforceable. By providing protection against the circumvention of technological measures, the copyright regime has further increased the superiority of this new form of regulation over traditional copyright law. *Ibid.*

¹⁰⁴ See e.g. Severine Dusollier, concerned that the fair exercise of copyright exemptions such as criticism, news reporting, scholarship, or research, will not be maintained, and that free access to public domain works will be increasingly restrained. DUSOLLIER, S. (1999) Electrifying the fence: the legal protection of technological measures for protecting copyright. *European Intellectual Property Review*, 6.

¹⁰⁵ See e.g. Julie E. Cohen, arguing that an excessive protection of technological measures may preclude users from exploiting copyrighted works in a way that is expressly permitted under copyright law, thereby enabling copyright owners to rely on private legislation in order to expand their rights far beyond the limits of copyright law. COHEN, J. E. (1997) Some Reflections on Copyright Management Systems and Laws Designed to Protect Them. *Berkeley Technology Law Journal*, 12.

¹⁰⁶ See e.g. *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 294 (S.D.N.Y. 2000), *aff'd*, 273 F.3d 429 (2d Cir. 2001), where the plaintiffs obtained an injunction against the distribution of the DeCSS software, which reverse engineered the CSS algorithm in order to be able to play a DVD on a higher number of playback devices, but thereby allowing decryption of DVDs without paying CSS licensing fees; *United States v. Elcom Ltd. & Sklyarov* (2002) 203 F.Supp.2d 1111, 62 USPQ2d 1736, where the defendant's software that allowed to convert Adobe e-books into standard PDF format was condemned under the terms of the Digital Millennium Copyright Act as a product designed to circumvent copyright protection measures; *RealNetworks, Inc. v. Streambox, Inc.*,

granted to technological measures of protection has often been exploited by a number of right holders in order to restrain freedom of expression and scientific research,¹⁰⁷ as well as to impede competition and to obstruct the normal course of innovation.¹⁰⁸

Copyright law is being increasingly criticized by a large number of scholars who claim that the traditional *ratio* of copyright law has been disrupted¹⁰⁹ and that the balance has nowadays shifted too much in favor of right holders and to the detriment of end-users.¹¹⁰ In an attempt to reproduce the characteristics of the physical world into the digital environment, the preservation of the status quo has therefore been jeopardized.

B. LEGISLATIVE CONCERNS

Copyright law must set up a trade-off between the economic interests of right holders and the interests of society in ensuring the public availability of works. In order to do so, the copyright regime must necessarily

2000 WL 127311 (W.D. Wash. Jan. 18, 2000), where the plaintiff obtained an injunction against the distribution of the defendant's software designed to permit the time-shifting of Internet streaming media.

¹⁰⁷ See e.g. *Universal City Studios, Inc. v. Reimerdes*, 111 F. Supp. 2d 294 (S.D.N.Y. 2000), *aff'd*, 273 F.3d 429 (2d Cir. 2001), where the 2600 Magazine has been prohibited from publishing, or even linking to the DeCSS software program that defeats the CSS encryption used on DVD movies; *Felten & al. v. RIAA & al.* (2001) District Court of New Jersey, case No. Case No. CV-01-2669 (GEB), where the RIAA sought to prevent the publication of a paper by the plaintiff which described flaws in a digital music watermarking technique by threatening suit under the Digital Millennium Copyright Act and the plaintiff sued claiming the right to present the results of the research on the grounds of the first amendment; Hewlett-Packard's threats to invoke section 1201 of the DMCA when researchers published a security flaw of HP's Tru64 UNIX operating system; Blackboard Inc.'s threats to invoke the DMCA in order to prevent the presentation of research relating to security vulnerabilities in its products at the InterzOne II conference in Atlanta.

¹⁰⁸ See e.g. *Lexmark International, Inc. v. Static Control Components, Inc.*, 387 F.3d 522 (6th Cir. 2004), where the plaintiff invoked the Digital Millennium Copyright Act to prevent the defendant's manufacture of computer chips that enabled to produce toner cartridges compatible with the laser printers manufactured by the plaintiff; *Sony Computer Entertainment America Inc. v. Gamemasters*, 87 F.Supp.2d 976 (N.D. Cal. 1999), where the court held that by circumventing the regional encoding mechanism put by Sony on its Playstation games, the defendant Software appeared to be a device whose primary purpose was to circumvent a technological measure that effectively controls access to a copyrighted work, thereby giving Sony an exclusive right to control the complementary market of Playstation games; but see the *Australian case Stevens v Kabushiki Kaisha Sony Computer Entertainment*, [2005] HCA 58 (Oct. 6, 2005), where the court held that the regional encoding mechanism of Sony PlayStation games did not qualify for legal protection as it did not prevent or inhibit copyright infringement.

¹⁰⁹ See e.g. Lawrence Lessing, arguing that the Internet and the new technologies have disrupted the traditional balance of copyright law and that the copyright reforms have only reinforced the new state of affairs, rather than attempting to reestablish the original balance. LESSIG, L. (2004) *Free Culture*, New York, The Penguin Press.

¹¹⁰ See e.g. Pamela Samuelson, arguing that, with the implementation of the WIPO Treaties, the legitimate exploitation of technologically protected works has become subject to the sole discretion of right holders, according to whether or not they are willing to implement adequate measures allowing users to exercise their rights. SAMUELSON, P. (2003) DRM {and, or, vs.} the Law. *Communications of the ACM*, 46, SAMUELSON, P. (1999) Intellectual Property and the Digital Economy: Why the Anti-Circumvention Regulations Need to be Revised. *Berkeley Technology Law Journal*, 14, SAMUELSON, P. (2001) Anticircumvention Rules: Threat to Science. *Science*, 293.

address a series of legal and practical dilemmas, many of which have been further accentuated Internet and digital technologies.

In the recent years, many provisions of the copyright regime have eventually been revised to better conform to the properties of the new environment. Yet, while some concerns have been addressed - at least partially, others have been intensified as a result of these very same legislative reforms.¹¹¹

1. SUBOPTIMAL AVAILABILITY OF WORKS

Copyright law was originally conceived for the purpose of furthering the public good. Although the context has changed, the original *ratio* of the copyright regime should be preserved in the digital environment. The law should therefore try to promote not only the creation and the production of creative works, but also the distribution and the dissemination thereof, in order to ensure that an optimal quantity of works will be made available to every member of society either before or after copyright protection has expired.

These objectives can be achieved differently in the physical and in the digital world. Digital technologies have dramatically reduced the costs to be incurred in producing a work, so that fewer economic rewards have become necessary to recoup the fixed costs of production. This makes it possible for content to be produced by anyone and at very low costs. Empirical data has shown that the production of digital works by end-users has been constantly increasing in the past few years, regardless of the amount of economic rewards that may be eventually retrieved. In particular, as more users can participate in the production of knowledge, User Generated Content (UGC) has become one of the most valuable resources of the Internet. As a result of Web 2.0 technologies, content can be produced and published by anyone without the need to rely on any central authority. A very large number of Internet users are involved in the production of UGC, and in most cases, UGC has become even more popular than the content generated professionally (see e.g. the significant success of Wikipedia, Youtube, Flickr, etc).¹¹²

In the context of digital works, strong and extensive exclusive rights may therefore no longer be necessary to provide incentives for authors to create. Instead, they may actually constitute an obstacle to the production of new works based on the re-elaboration of previous works. A participatory culture is progressively emerging in

¹¹¹ Over the years, the copyright regime has been subject to continuous reforms in order to adapt to technological advances. To the extent that the law has been adequately designed, it should in fact be possible to apply it by analogy to any new technological development. Yet, the law might not forever be extended without the incurring the risk that it no longer applies to every type of circumstances. With the advent of digital technologies, in particular, a mere legislative reform may no longer be sufficient, as the whole copyright system may have to be rethought in order to be more consistent with the digital environment. See e.g. LITMAN, J. (1996b) *Revising Copyright Law for the Information Age*. *Oregon Law Review*, 75.

¹¹² In the USA, 35% of Internet users have contributed at least once to a UGC repository, and similarly in many other advanced countries such as Europe, Japan and Korea. For a more general overview, see OECD (2007) *Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking..* For a more detailed analysis of the production of UGC, see OCHOA, X. & DUVAL, E. (2008) *Quantitative Analysis of User-Generated Content on the Web*. *Webevolve 2008*. Beijing, China. The implication is that the industrial model of production, characteristic of the physical world, may no longer be necessary in the digital world.

the digital environment, where anyone can easily engage in any kind of creative activity. In the digital world, self-expression has become the norm. As opposed to the physical world, users are no longer mere consumers of information, but have been progressively turning into producer as well. Although the original goal of copyright law was to stimulate creativity and to encourage the production of new works, excessive copyright protection may ultimately stifle creativity to the extent that it precludes the use of certain copyright works for the production of new works, thereby limiting the number of derivative works that would otherwise be produced.¹¹³

In addition, in the digital environment, a large variety of actors may intervene in the process of making works available to the public. Although traditionally performed either by the author, the producer, or the publisher of a work, this function is now also being accomplished by end-users and the strategy of viral marketing is progressively becoming one of the most efficient solutions against the problem of information overload characteristics of the digital world.¹¹⁴

According to Benkler, three categories of actors play an important role in the production and dissemination of copyright works:¹¹⁵ (1) market actors whose core business is essentially based on the commerce of copyright works (e.g. content providers); (2) market actors for which copyright works do not actually constitute the main object of business, although they are nevertheless necessary for the purpose of making their activity more attractive to consumers (e.g. websites, journals, magazines); and (3) non-market actors, whether governmental or not, which are for the most part concerned with the maximum dissemination of their works.

The first category of actors significantly benefits from the proprietary model of the copyright regime. The second category of actors does not directly benefit from copyright law but is also not negatively affected by it. Conversely, the third category of actors is actually bothered by the provisions of the copyright regime in at least two ways. To begin with, unless the activity clearly qualifies as fair use, a derivative work can only be made after clearing the rights vesting in the original work - even if it has never been meant to be used commercially. In fact, the production of information depends on a combination of three different types of factors: (1) the amount and the availability of pre-existing information (2) technological means necessary to process old information and to produce new information (3) authors' intrinsic creativity. While the Internet has drastically increased the amount of information available to the public and the digital technologies have drastically reduced the costs of processing and producing digital content, the exclusive rights granted by

¹¹³ See e.g. SHI, S. X. (2008) *The Place of Creativity in Copyright Law*. Queensland University of Technology.

¹¹⁴ Users' reviews may be regarded as some form of marketing which is usually considered more trustworthy than most commercial advertisements or other kinds of marketing strategies. On the Internet, user generated content describing the advantages, the flaws or the overall quality of digital Works may therefore progressively replace the more traditional forms of advertisement based on mass media. See, in particular, BURMANN, C. & ARNHOLD, U. (2008) *User Generated Branding: State of the Art of Research*, LIT Verlag. In addition, certain business models have recently been developed, allowing for end-users to be involved not only in the dissemination of digital Works, but also in the marketing thereof. In particular, in order to encourage the viral dissemination of Works, end-users may be remunerated for every resale of these Works even if they do not the copyright thereof. See e.g. the Potato System, at <http://www.potatosystem.com>

¹¹⁵ A thorough and detailed analysis of the different types of players involved in the entertainment industry can be found in Chapter 2 of BENKLER, Y. (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press.

copyright law may preclude certain authors from taking advantages of these new opportunities.¹¹⁶ In addition, given that the provisions the copyright regime would otherwise constitute an obstacle to the reproduction and the widespread dissemination thereof, non-market actors are often required to bear the costs of freeing the content of their own works.¹¹⁷

In recent years, the size of the latter category of actors has been growing exponentially and its relative impact on the cultural sectors of society has been constantly increasing compared to the two former categories.¹¹⁸ Accordingly, in view of the specificities of the digital environment, the legislative reforms should not merely attempt to replicate the provisions of copyright regime into the digital world, but should rather try and adapt them to the digital world. In particular, to the extent that these activities would be better achieved if end-users were allowed to contribute in the process, the question is whether the copyright owner should remain the sole actor entitled to control the production, the distribution and the marketing of digital works.

2. IMPERFECT MARKET FOR INFORMATION GOODS

Even though the purpose of copyright law is to turn a work into a private good, the current implementation of the copyright regime does not allow for that work to be traded on the market like any other commodity.

One of the major challenges in the establishment of a market for information goods is that there is an inherent conflict between the copyright regime and the regime of property law. By acquiring the copy of a work, the user only acquires a property right over a particular medium (e.g. a particular book, CD or DVD, etc) but not over the expression of the work which has been embodied therein. The copyright owner maintains absolute control over the exploitation of that work and can therefore restrain the usage of any other piece of property to the extent that this is necessary in order to protect the copyright in the work.¹¹⁹ While the exhaustion of rights

¹¹⁶ See e.g. ABRAMS, H. B. (1992) Originality and Creativity in Copyright Law. *Law and Contemporary Problems*, 55. For a more specific overview on the problems that copyright law may cause to creativity in the digital environment, see CAMPBELL, J. (2007) Authorship, incentives for creation, and copyright in the digital 21st century. *American Society for Information Science and Technology*.

¹¹⁷ While Open Content licenses are intended to reduce the transaction costs that should otherwise be incurred by end-users in order make use of a work, they may however require any potential licensee to incur additional costs in order to establish the specific terms and conditions under which the work can be exploited. Creative Commons, amongst others, have successfully attempted to reduce these transaction costs by providing users with a variety of default licenses with a standard set of rights and obligations. See ROSNAY, M. D. D. (2006) Creative Commons: Open Content Licenses to Govern Creative Works. *UPGRADE: European Journal for the Informatics Professional*, 7.

¹¹⁸ Indeed, although commercial actors still play a significant role in the production of information, on the Internet, information is increasingly being produced by non-market actors whose motivations are not based on economic rewards, or alternatively, by market actors whose business strategies are not directly concerned with the exclusive rights granted by the copyright regime. The production of information for non-commercial purposes is therefore assuming a more central position in the economy of today. For a more detailed analysis, see BENKLER, Y. (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press.

¹¹⁹ If property rights in intangible goods can only be recognized through the allocation of rights in tangible goods, the owner of the copyright in a work can therefore prevent others from exploiting their property as they chose, to the extent that doing so would infringe the copyright in the work. Copyright consequently impinges upon the regime of property rights by restricting the use of

might partially resolve this problem, it is unlikely to eliminate the conflict between these two bodies of law.¹²⁰ Moreover, given that the doctrine of exhaustion is only concerned with the tangible copies of a work,¹²¹ a secondary market for information goods would be particularly difficult to achieve in the digital world.

The problem is further accentuated by the fact that, in the digital environment, users no longer acquire ownership of the copies of a work but merely acquire the right to consume it.¹²² The object of trade is no longer the copy of the work but rather that particular set of rights and obligations governing the access and usage of the work.¹²³ The difference is that, while the copyright consists of a series of proprietary rights vesting in the expression of a work and enforceable *erga omnes*, a copyright license ultimately amounts to a contractual agreement which is only enforceable *inter partes*. In view of their personal character, the rights and obligations granted to every licensee cannot be transferred to any third party without the express consent of the copyright

private property. For instance, while anyone may be entitled to read the content of a book, the consent of the copyright owner would necessarily be required in order to read it aloud in front of a public. Similarly, the owner of any tangible resource is theoretically allowed to use it in any way and for any purpose whatsoever, but only to the extent that the usage thereof does not invade the copyright vesting in the expression of a work. Accordingly, while anyone may be entitled to combine paper and ink in order to produce a print, these resources may however not be employed in order to reproduce the content of a work subject to copyright protection. See KINSELLA, N. S. (2001) Against Intellectual Property. *Journal of Libertarian Studies*, 15.

¹²⁰ While the doctrine of exhaustion is likely to partially eliminate the conflict between copyright law and property law, the free trade of information goods may nevertheless be restrained even after the exclusive right of distribution has been exhausted. For instance, one may not draw on a painting which has been legitimately purchased in order to re-distribute it on the market, because that would infringe upon the exclusive right to make derivative works which has been granted to the copyright owner. Similarly, one may not display and/or communicate the work (albeit untouched) to the public, because that would infringe upon the exclusive right of making available, nor can one rent a work which has been previously purchased because the exclusive rental/lending right is not exhausted after the first sale of the work.

¹²¹ The principle of exhaustion (according to which the exclusive right of distribution is exhausted with regard to a particular item of a work as soon as it has been exercised for the first time) has been expressly excluded from the digital environment by the WIPO Copyright Treaty, which provides for the exhaustion of the exclusive right of distribution (Article 6), but only with regard to "fixed copies that can be put into circulation as tangible objects" (Agreed statements concerning article 6). See also the European Copyright Directive 2001/29/EC (recital 29), according to which "the question of exhaustion does not arise in the case of services and on-line services in particular [...] Unlike CD-ROM or CD-I, where the intellectual property is incorporated in a material medium, namely an item of goods, every on-line service is in fact an act which should be subject to authorization where the copyright or related right so provides."

¹²² With the deployment of digital technologies, the dissemination of works has developed from a system based on the distribution of physical copies, for which the user generally had to pay a price in order to obtain full access to the work, into a system of access privileges imparted by the means of copyright licenses which precisely stipulate the condition under which the work can be enjoyed. See ELKIN-KOREN, N. (1996) Public/Private and Copyright Reform in Cyberspace. *Journal of Computer-Mediated Communication*, 2.

¹²³ A contract may sometimes be regarded as a standard commodity which can be traded on the market like any other product. For instance, to the extent that they do not involve the transfer of any additional asset, it is often the case that most end-user licensing agreements actually constitute the sole product of a transaction. In the case of digital works, although a digital asset is being exchanged in the market, the copyright license can be regarded as a constitutive part of the product, insofar as it directly affect the manner in which and the extent to which the work can actually be consumed. See BURKE, J. J. A. (2003) Reinventing Contract. *Murdoch University Electronic Journal of Law*, 10.

owner.¹²⁴ Insofar as the property rights vesting into a particular object of trade cannot be freely disposed of, the market mechanism is likely to be severely constrained. Unless it has been released under a license that explicitly allows for the transfer or the sub-licensing of rights, any digital work acquired by means of a specific licensing agreement may in fact only be consumed by the particular user which constitutes the recipient of the license.

The transfer of digital works based on the licensing of rights is therefore likely to lead to the establishment of a market for information goods dominated by a network of contractual relationships regulating the use and the consumption of digital works.¹²⁵ As a result, every copy of a digital work would necessarily turn into an imperfect commodity which cannot be reintroduced into the market without the authorization of the copyright owner. This is likely to drastically reduce the opportunities for a free market for information goods to develop in the digital environment, despite it being one of the primary justifications for the establishment of the copyright regime.

3. CONSUMER EXPECTATIONS

The proper enforcement of the copyright regime cannot be achieved in the digital environment unless the legitimate expectations of consumers have been taken into account.¹²⁶ The ever increasing amount of online piracy is partially due to the fact that the current copyright regime is not in line with consumer expectations in the digital environment. While lawsuits may sometimes be regarded as a deterrent on copyright infringement, legal sanctions are unlikely to have an impact on the actual expectations of end-users. In order to reduce the level of infringement in the digital environment, alternative strategies other than criminal prosecution should be adopted, aimed at providing users with a better knowledge and an increased acceptance of copyright law. The first step is, therefore, to identify what legitimate expectations of Internet users have.

¹²⁴ See e.g. the *Gardner* case regarding the exclusive license granted by Nike for Sony to be able to exploit the copyright vesting into a particular cartoon character. To answer the question as to whether Sony was indeed allowed to transfer the rights and obligations provided for by the license to any other third party, the Court of Appeal held that since Sony had not been specifically given the right to further sublicense the rights granted under the copyright license, the transfer of these right was not permitted under section 201(d)(2) of the US Copyright Act. For more details, see *Gardner etc. al vs. Nike Inc.* (2002) 9th Cir. 279 F.3d 774. With regard to the transferability of non-exclusive licenses, see also *Everex Systems v Cadtrack Corp* (1996) 9th Cir. 83 F.3d 673, 679; *Unarco Industry v Kelley Co.* (1972) 7th Cir. 465 F.2d 1303, 1335; *Harris v Emus Records Corp* (1984) 9th Cir. 734 .2d 1329, 1333.

¹²⁵ Intellectual property rights can be regarded as default rules which are ultimately meant to be revised by the means of contractual agreements. In the digital environment, contract law may however acquire a more important role than copyright law on the market for information goods. Indeed, while the terms and conditions of most end-user licensing agreements generally rely upon the exclusive rights of the copyright regime, they may sometimes extend beyond the scope of copyright protection and become enforceable under contract law. For more details, see e.g. NIMMER, R. T. (1998) Breaking Barriers: The Relation Between Contract and Intellectual Property Law. *Berkeley Technology & Law Journal*, 13.

¹²⁶ For instance, given that most Internet users believe that file sharing should be legal, copyright enforcement is unlikely to succeed until the concept of file sharing as an acceptable social norm has not been repudiated. See DEPOORTER, B. & VANNESTE, S. (2006) Norms and Enforcement: The Case Against Copyright Litigation. *Oregon Law Review*, 84.

As a general rule, users' expectations will vary according to the nature and the type of work that is taken into account. Over the years, consumers have developed a number of expectations with regard to what they may be entitled to do with different types of works. In recent years, these expectations had to be revisited, since, with the advent of Internet and digital technologies, the manner in which a work can be produced, consumed and disseminated has changed dramatically. Given the difference in expectations with regard to a work encoded into a digital format and a work incorporated into a physical medium, users are likely to rely upon different methods of consumption for these two categories of works. Technological changes can therefore be regarded as a significant source of change with reference to both user expectations and social norms.¹²⁷

On the one hand, given that digital technologies fundamentally allow for any given piece of content to be reproduced by anyone and to be redistributed to anyone over the Internet network, many Internet users expect information to be free and to be ubiquitously available without any restriction over the reproduction or the dissemination thereof. Users may therefore be reluctant to pay for a digital work even if they would have no problem to do so in the physical world.¹²⁸ The problem is that these expectations are entirely incompatible with the principles and the current implementation of the copyright regime.

On the other hand, the content industry has progressively taught users that what they can expect from a work in the physical world is not necessarily be the same as what they may expect from a digital work. Rights holders can in fact restrain the consumption of digital works by way of restrictive licensing agreements whose terms and conditions can be automatically enforced by technological means. Economic theories claim that it is in the interests of right holders to offer a product in line with consumer expectations, because, to the extent that certain terms and conditions are unreasonable or excessively restrictive, they will presumably be rejected by the market. Yet, market competition is necessary for consumers to be given a choice between different

¹²⁷ Any technological advance is likely to affect the way people perceive and interact with the world. Indeed, in view of the new opportunities to produce, store, process, transport or display information, digital technologies have had a profound impact on user expectations. For more details on the impact of Internet and digital technologies on society, see HAMELINK, C. J. *New Information and Communication Technologies, Social Development and Cultural Change*. United Nations Research Institute for Social Development.

¹²⁸ Digital content is generally offered for free on the Internet, on the one hand, because many content providers are unable or unwilling to commercialize it in the digital environment, and, on the other hand, because many Internet users who have always been used to access digital content for free may now refuse to pay for it. Besides, users are generally unwilling to pay for content that is actually available for free, albeit illegally, from an alternative source (e.g. file-sharing websites, peer-to-peer networks, etc). The development of better business models for the exchange of digital content and the implementation of a user-friendly infrastructure for the commercialization thereof may however eventually lead to a progressive acceptance of paid content. For more details, see e.g. WESSELS, J. (2001) *The future of digital content - Free or paid? Innovations for an e-Society: Challenges for Technology Assessment*. Berlin.

products so as to select the one that best meet their expectations concerning both quality and price.¹²⁹ Accordingly, while certain content providers may actually attempt to give consumers a product that is consistent with their preexisting expectations, others may develop a series of contractual agreements that actually contribute to shaping and indirectly manipulating consumer expectations.¹³⁰ As a result, users may reduce their level of expectations and what may appear unconscionable in the physical world may eventually be regarded as acceptable in the digital environment.

¹²⁹ A perfectly competitive market can be regarded as a discovery mechanism. In fact, in a situation of perfect competition, the preferences of consumers ultimately determine which products will be purchased and at what price. In the context of digital works, copyright owners will therefore only be able to sell their works if they release it under particular terms and conditions which are in line with the standard expectations of consumers. Accordingly, DRM systems do not necessarily conflict with the interests, insofar as they can be used in order to price discriminate amongst consumers with different preferences and expectations. See GUIBAULT, L. & HELBERGER, N. (2005) Copyright Law and Consumer Protection. *Policy conclusions of the European Consumer Law Group*. Institute for Information Law, University of Amsterdam.

¹³⁰ According to Pamela Samuelson, “the main purpose of DRM is not to prevent copyright infringement but to change consumer expectations about what they are entitled to do with digital content.” Indeed, given that every technological measure of protection will eventually be circumvented, DRM systems are not expected to completely eliminate the illegitimate reproduction and dissemination of digital content. Yet, while they may nonetheless be able to reduce it for a certain period of time, the most important function of DRM systems is to modify the expectation of consumers, as they get used of the fact that digital content is generally made available under restrictive terms and conditions. See SAMUELSON, P. (2003) DRM {and, or, vs.} the Law. *Communications of the ACM*, 46.

PRIVATE REGULATION

Conceived for the physical environment, the copyright regime has been designed a self-regulating system, where every work of authorship can be regarded as an independent object of trade provided that the legal properties of the work are consistent with the physical properties of the medium into which it inheres. The deployment of Internet and digital technologies has however shown that the preexisting copyright regime is not suitable in the digital environment and needs to be reformed. If the default rule of the copyright regime is no longer compatible with the digital environment, solutions can be implemented through public regulation (legislative reforms) or private regulation (market-based solutions).

Regulation does not necessarily involve government intervention. While copyright law is necessary to establish the basic framework of a proprietary right over information, the private sector can avail itself of various mechanisms in order to produce and enforce specific norms, rules, or codes of conducts without relying upon any intervention from the State.¹³¹

In the context of copyright law, the length and complexity of the legislative process, as opposed to the speed and unpredictability of technological advances, may bring private regulation as a valid alternative to the legislative reform of the copyright regime. In many situations, private actors are in fact better candidates to regulate a specific area of the industry because they are more aware of the context in which they operate. They can thus implement a more suitable regulatory system for the particular field of industry to which it is intended to apply. Besides, the regulatory process implemented by the private sector is likely to be much more efficient than the legislative process of the State constrained by an established bureaucratic system.

SECTION 1

SELF-REGULATING REGIME

A self-regulating system is the most effective way to achieve a stable environment for the regulation of information. If a system can regulate itself without relying upon external intervention, the system is likely to operate in an organic way whereby every part cooperates in order to achieve a common objective. The proper functioning of a self-regulating system is, therefore, guaranteed by its own structure and can only be jeopardized by external forces.

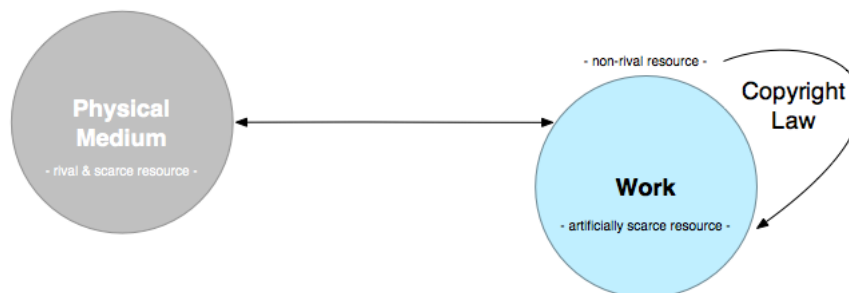
¹³¹ Standards setting, certifications, monitoring, warranties, and arbitration are only a few examples of the various ways in which the private sector can regulate a particular sector of the industry without government intervention. For more details on the operations of private regulation, as opposed to public regulation, see e.g. YILMAZ, Y. (1998) Private Regulation: A Real Alternative for Regulatory Reform. *Cato Policy Analysis*, 303.

The copyright regime emerged from the realization that, in order for any work of authorship to be traded on the market, it must first become an object of trade. By granting a series of proprietary rights to the author of any original work, copyright law makes it possible for an intangible work to turn into a private good which, like any other type of commodity, can be economically exploited.¹³²

The problem is that copyright law has been conceived for physical media. As such, it has been implemented in such a way as to create a self-regulating environment, where the properties of the work are in line with the properties of the physical medium into which it has been incorporated. In order to do so, copyright law tried to replicate the properties of the physical medium of expression in the work itself, thereby turning the work into a private good.

However successful it may be in terms of physical works, the current implementation of the copyright regime no longer qualifies as a self-regulating system in the digital environment because the properties of the medium are once again misaligned with the properties of the work as defined by copyright law. The important distinction is that, as opposed to most physical media, digital content qualifies as a non-rival resource which can be consumed simultaneously by everyone.

A. IN THE TANGIBLE ENVIRONMENT



In the physical world, the copyright regime can fundamentally be regarded as a self-regulating system. In spite of the standard controversies surrounding the determination of copyright infringement, the system has been built to take advantage of the physical barriers provided by the tangible world in order to reduce the likelihood of infringement.

Given that a work of authorship qualifies as an abstract and intangible entity, it can fundamentally be regarded as a public good.¹³³ A work is intrinsically non-rival in consumption (i.e. a work can be enjoyed simultaneously

¹³²As a general rule, there can be no market without property rights, because if there is no private property there can be no object of trade. Accordingly, copyright law provides author with a series of proprietary rights in the original expression of their works in order to allow for a market of creative works to develop. For more details, see LANDES, W. M. & POSNER, R. A. (2003) *The Economic Structure of Intellectual Property Law*, Cambridge, Massachusetts, The Belknap Press of Harvard University Press.

¹³³ While the work, the expression and the manifestation thereof may only be regarded as public goods, the item into which they are being incorporated may amount to either a private good or a public good, according to whether it constitutes a tangible or an

by an indefinite number of people) and non-excludable (i.e. once a work has been disclosed to the public, it becomes extremely difficult to exclude people from enjoying it, without relying on any legal or technological means). In contrast, as a tangible entity, the physical resource into which the work has been incorporated ultimately qualifies as a private good. The consumption of one item by a person necessarily precludes the simultaneous consumption of the same item by another, and, to the extent that it qualifies as private property, the owner of the item is entitled to exclude others from the enjoyment thereof.

There exists, therefore, a fundamental disparity between the properties of the work (which is essentially non-rival and non-excludable) and the properties of the medium (which is both scarce and excludable). Yet, the two are inherently interconnected. On the one hand, the value of the former cannot be appreciated independently of the latter, since a work can only be experienced once it has been incorporated into a tangible medium of expression. On the other hand, however, the value of the latter is intrinsically connected to the value of the former, since the market value of an item ultimately depends upon the value that has been assigned to the work it embodies. In spite of their distinction, the two must therefore be bundled together in order for the work to be enjoyed and for the item to be traded on the market.

Copyright law can thus be regarded as an attempt to realign the properties of the work with the properties of the physical items by which it is being conveyed to the public. In particular, by providing copyright owners with a series of exclusive rights which enable them to exclude others from exploiting the work,¹³⁴ the expression,¹³⁵ and, to some extent, the manifestation of a work,¹³⁶ copyright law eventually turns any original

intangible item. In particular, whenever a work is being conveyed to the public by the means of a tangible item (such as books, sound recordings, video tapes, etc), the private good nature of the item may prevail over the public nature of the work, which may therefore be regarded as a private good (being both rival and excludable), since it may only be enjoyed by one individual at a time. See VARIAN, H. R. (1998) *Markets for Information Goods*. University of California, Berkeley, CA. This may however not be the case in the digital environment, where the item itself shares the same characteristics as a public good.

¹³⁴ As a general rule, since the copyright regime does not protect the ideas underlying a work (see article 9(2) of the TRIPs Agreement), the work as a purely abstract and conceptual idea cannot as such be protected. This is not to say that copyright law will never protect the concept of a work, but only that, in order to be protected, a work has to be regarded as something more than a mere idea and thus assume a sufficiently developed structure which can be easily recognized in the case of non-literal copying. The idea/expression dichotomy in copyright law establishes a distinction between the conceptual idea of a work (as such not protected by copyright law) and the detailed idea or the structure of the work (indirectly protected by extending the scope of copyright protection so as to also cover substantial non-literal similarities). See, in particular, NIMMER, M. B. & NIMMER, D. (1963-85) *Nimmer on Copyright: A Treatise on the Law of Literary, Music and Artistic Property, and the Protection of Ideas*, New York, Matthew Bender & Co. (distinguishing between “fragmented literal similarity” and “comprehensive non-literal similarity”).

¹³⁵ The expression is the fundamental element of a work which is protected by copyright law. Copyright protection however only extends to the original parts of the expression (those which originate from the author) and is not concerned with any of the underlying facts or ideas that are being expressed by the work. If the expression incorporates pieces of content that do not originate from the author (e.g. mere facts or content taken from the public domain), they will therefore not be protected under the copyright regime. See ABRAMS, H. B. (1992) *Originality and Creativity in Copyright Law. Law and Contemporary Problems*, 55.

¹³⁶ The manifestation of any given expression may also be subject to copyright protection, whenever the copyright regime provides protection for the typographical arrangements of published editions. However, in the absence of international obligations, only a few jurisdictions have decided to extend copyright protection to this particular type of works. See e.g. the UK Copyright, Designs and Patents Act of 1988, section 1(1)(c); the New Zealand Copyright Act of 1994, section 14(1); the Hong Kong Copyright Ordinance

work of authorship into an excludable good which cannot be freely enjoyed by anyone. Artificial scarcity is a natural consequence of excludability, given that it is not possible to benefit from the non-rival properties of information insofar as the work can no longer be exploited without the consent of the copyright owner. As long as it is eligible for copyright protection, any original work of authorship ultimately qualifies as a private good.

Accordingly, from a legal point of view, the role of the copyright regime is essentially that of realigning the public nature of the work with the private nature of the items that incorporate it, so they can both be disposed though the market.¹³⁷ As a result of copyright law, the legal properties of any given work of authorship have been brought in line with the physical properties of the physical medium into which it has been incorporated. For example, while a series of physical constraints may prevent a physical book from being reproduced and distributed on a large scale, a variety of legal constraints will preclude the content of the book from being reproduced and distributed beyond the private sphere.

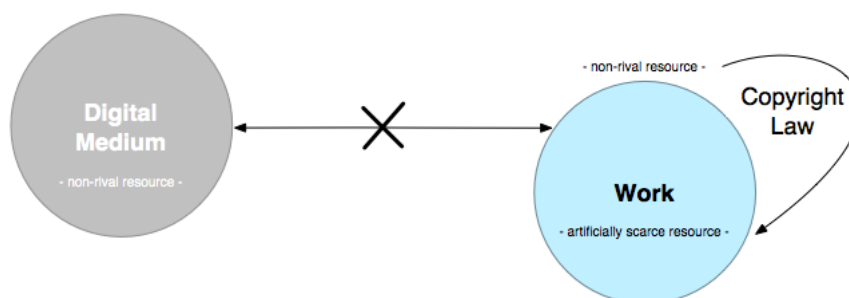
Consequently, by effectively prohibiting the commercial reproduction of copyrighted works, the law created a self-regulating environment capable of dissuading the majority of end-users from illegitimately reproducing a work insofar as the medium it had been embodied into cannot itself be easily reproduced without resorting to commercial models.¹³⁸ Until the advent of the digital technologies, this mechanism has been relatively successful. Indeed, in the tangible environment, the provisions of copyright law have always been partially enforced by the physical characteristics of the medium incorporating a work. The properties of the physical world can therefore be regarded as a natural barrier to copyright infringement, which is more likely to be confined to a small number of commercial infringers.

Law, section 2(c); whereas the USA and the majority of civil law countries do not regard typographical arrangements as a copyrightable subject matter.

¹³⁷ By preventing the unauthorized reproduction of any original work of authorship the copyright regime establishes a connection between the expression of a work and the medium into which it has been incorporated. This connection is aimed at reconciling the public good nature of the work and the private good nature of the carrier by which the work is being conveyed to the public, thereby converting the work into a private good as a result of artificial excludability introduced by legal means. For more details on the role of copyright law in realigning the properties of the work as an intangible entity with the properties of the tangible manifestation thereof, see BENTLEY, N. (2007) Trading Rights to Digital Content. *International Workshop for Technical, Economic and Legal Aspects of Business Models for Virtual Goods*. Koblenz, Germany.

¹³⁸ In the physical world, most of the provisions of copyright law are eventually self-enforcing. This is a result of the fact that the reproduction of a work necessarily involves the reproduction of the item into which the work is being conveyed that analogical technologies may not allow for all content to be replicated without quality loss. Besides, copyright infringement can be further discouraged by the fact that the tangible medium into which the work has been embodied does not generally permit any alteration or modification of the work to be performed without causing any irremediable damage to the original item. See, e.g. DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press.

B. IN THE DIGITAL ENVIRONMENT



Because of the intrinsic nature and essential characteristics of digital works, the self-regulating feature of the copyright regime does no longer apply in the digital world. Hence, as the properties of the work are once again misaligned with the properties of the medium, preventing copyright infringement in the digital environment has become a challenge.

Indeed, the advent of digital technologies has completely transformed the nature and form of copyrighted works. Through the process of digitization, the item itself is turned into an intangible good and the work essentially become independent from the medium into which it is embodied. Although physical media (e.g. a CD, DVD or hard-drive) are fundamentally scarce and therefore rival in consumption, this is not necessarily the case for digital items. In fact, insofar as they can be reproduced in no time and at virtually no costs, digital items may no longer qualify as a scarce resource, given that the consumption of one item by one person does not necessarily reduce the overall quantity of items available to the others.¹³⁹ Moreover, digital items do no longer possess any of the mechanisms of excludability characteristics of tangible goods. While the producers of a digital work may prevent unauthorized users from accessing the work at the source, they do not have the power to preclude access to anyone who obtained an item of the work indirectly. Since it can be reproduced at no significant cost, anyone who has legitimately purchased the item may subsequently become a potential supplier of the work and the more it has been disseminated, the lower will be the ability of the producer to exclude anyone from enjoying the work.¹⁴⁰ Accordingly, as a result of its replicability, any digital instantiation

¹³⁹ Internet and digital technologies have given the possibility for anyone to reproduce, modify and/or redistribute copies of any digital work on a worldwide scale, in virtually no time, and at very low costs. The properties allowing for the self-enforcement of the copyright regime within the physical world are therefore lacking in the digital environment, where copyright infringement is no longer subject to any kind of technological barrier. For more details on the impact of the digital technologies on the enforceability of copyright law, see e.g. HALPERN, S. W. (2001) *The Digital Threat to the Normative Role of Copyright Law*. *Ohio State Law Journal*, 62.

¹⁴⁰ In the digital environment, only the first unit of a work can actually be regarded as being excludable, since the producer is the sole person in possession of the work. Yet, as soon as the work has been transferred to a third party, the producer is no longer the sole supplier of the work in that the third party can potentially redistribute the work to the public. While the dissemination of the work may not occur instantly, the number of person capable of obtaining the work is likely to grow exponentially as the number of potential suppliers grows. Accordingly, while a digital work is theoretically excludable, it may become *de facto* non excludable as soon as the number of users owning the work becomes sufficiently large. Accordingly, the non-excludability of digital works is a direct consequence of their non-rivalry. In fact, to the extent that any user disseminating a work would automatically be deprived from the usage thereof, the dissemination of the work would be much more limited. Accordingly, if they were rival, digital works

of a work can ultimately be regarded as a public good which is both non-excludable and non-rival in consumption.¹⁴¹

However, to the extent that the expression of a work is still eligible for copyright protection, a digital work nevertheless qualifies as a particular kind of information good which may be traded on the market. As such, the work has in fact preserved the same qualities of excludability and is therefore still subject to the same form of artificial scarcity that it used to enjoy in the physical environment.

Digitization has brought a number of advantages to a variety of actors who operate in a new economy based on the exchange of intangible knowledge-based goods and services.¹⁴² As the costs of reproduction and distribution are moving towards zero, the impact of increasing returns to scale is considerably amplified (since, once the costs of producing the first copy have been recouped, the marginal cost of production for any additional copy is zero).

However, as the concept of scarcity progressively disappears, digital technologies are likely to eliminate the self-regulatory features of the copyright regime by destroying the link that had been established between the work (which has been turned into a private good as a result of copyright law) and the physical manifestation thereof (which has been turned into a public good by the advent of digital technologies). Consequently, the legal properties of the work are once again misaligned with the physical properties of the item in which it is being conveyed to the public.

This discrepancy may actually constitute the basis for the increasing piracy of digital works that has been observed in recent years. Indeed, while the copyright regime may preclude anyone from reproducing or distributing a digital work other than for personal purposes, the content of the work can easily be extracted

would necessarily be excludable as well. See RAYNA, T. (2008) Understanding the Challenges of the Digital Economy: The Nature of Digital Goods. *Communications & Strategies*, 71, 13-68.

¹⁴¹ With the advent of digital technologies, the medium into which a work is being conveyed to the public becomes itself a public good. In fact, as a result of their intangible nature, digital works are effectively non-rival in consumption: as they can be reproduced at virtually no costs, two or more individuals can consume the same digital work without affecting each other's consumption. Moreover, digital works are ultimately non-excludable, since, to the extent that every user becomes a potential supplier of the work, the possibility for the copyright owner to exclude users from enjoying a work decreases with the number of users who have already come into possession of the work. For more details on the public good nature of digital goods, see RAYNA, T. (2007) Digital goods as public durable goods. *Department of Economics*. Université Aix-Marseille III.

¹⁴² The changes introduced by Internet and digital technologies have promoted the development of new business models which can take advantage of the new digital framework. See, e.g. TAPSCOTT, D., TICOLL, D. & LOWY, A. (2000) *Digital Capital: Harnessing the Power of Business Webs*, Harvard Business School Press. In particular, direct e-commerce may enjoy a number of advantages over traditional commerce, the most important of which are (1) the availability of a global market place, (2) the considerable reduction of logistic costs and transaction costs, and (3) the possibility to better respond to users' needs by the means of product customization and price discrimination. For more information on the specific features of direct and indirect e-commerce, see, *inter alia*: RAYPORT, J. F. & JAWORSKI, B. (2002) *Introduction to e-Commerce*, McGraw-Hill, BAKOS, Y. (2001) The Emerging Landscape for Retail E-Commerce. *The Journal of Economic Perspectives*, 15, CHOI, S. Y. & WHINSTON, A. B. (1999) The future of e-commerce: integrate and customize. *IEEE Computer*, 31.

from the medium into which it has been incorporated in order to be reproduced and subsequently disseminated on a worldwide scale through the Internet network.

To a certain extent, piracy is a consequence of the inherent characteristics of digital works. As opposed to the physical world, where the medium actually constitutes a barrier to copyright infringement, in the digital world, copyright infringement is actually being favored by the intangible characteristics of the medium incorporating the work.

Accordingly, insofar as copyright law is no longer able to perform its function in the digital environment (i.e. that of realigning the properties of the work with that of the tangible medium of expression), additional contractual and/or technological measures have been developed by the private sector as an attempt to re-establish the self-regulating features of the copyright regime.¹⁴³ Private ordering may therefore acquire an increasingly important role in the regulation of information, as an attempt to re-establish the properties of a private good into the digital medium, or alternatively, to revert the expression of a work back to a public good.

SECTION 2

REGULATION BY PRIVATE MEANS

The scope of copyright protection has been designed as a default rule rather than as a mandatory attribute of the work. The reason is that, in order for any work of authorship to be exploited by anyone other than the copyright owner, it must be possible for right holders to either transfer or license each of the exclusive rights they have been granted with.

From the perspective of right holders, therefore, the purpose of copyright is twofold. On the one hand, it allows them to prevent others from exploiting a work in any way that would conflict with one of their exclusive rights. On the other hand, it gives them the possibility to consent for any such exploitations by ensuring the complete alienability and divisibility of these rights, at least with regard to the economic rights.¹⁴⁴ Anyone wishing to exploit a copyrighted work is, therefore, required to acquire the right to do so from the copyright owner. This may be done through the assignment of one or more exclusive rights in the

¹⁴³ Rather than relying on copyright law, a growing number of copyright owners are starting to rely on particular licensing agreements in order to refine and to license their rights. Private ordering is therefore taking priority over the provisions of the copyright regime, which are increasingly regarded as mere default provisions which can thus be bypassed and/or expanded by contractual means. See COHEN, J. E. (1998) Copyright and the Jurisprudence of Self-Help. *Berkeley Technology Law Journal*, 13.

¹⁴⁴ The alienability of copyright is clearly stated in section 201(d) of the US Copyright Code, according to which (1) the ownership of a copyright may be transferred in whole or in part by any means of conveyance or by operation of law and (2) any of the exclusive rights comprised in a copyright, including any subdivision thereof, may be transferred and owned separately. Civil law countries, such as France or Germany, are more restrictive and do not allow for the alienability of certain rights (e.g. moral rights), but nevertheless allow for the free alienability of all exclusive economic rights.

work or through the mere licensing of these rights.¹⁴⁵ This is generally achieved by means of contractual agreements specifically intended to modify the standard level of protection granted by default under the law, in order to allow for a particular exploitation of the work by third parties.

In other words, to the extent that they are not entirely satisfied with the level of protection that copyright law provides by default, rights holders are given the possibility to adjust the scope of copyright protection according to their corresponding needs and expectations. Through a series of private contractual agreements, right holders can regulate the manner and the extent to which a copyright work can be legitimately exploited by third parties, whose individual rights and obligations will be ultimately determined by the terms and conditions of the license.

As a result, private agreements between parties can either extend or reduce the standard level of protection provided by the law. Even though only the particular set of rights granted by default under the copyright regime can actually be enforced under a claim of copyright infringement, the owners of the copyright in a work can nonetheless rely upon the provisions of contract law in order to enforce the various terms and conditions that extend beyond the scope of the copyright regime. In addition, right holders can make use of specific technological measures in order to automatically enforce both copyright and contractual rights.

Given the speed and flexibility of private ordering – as opposed to the slow and bureaucratic operations of the legislative process – the argument for private regulation is therefore likely to be stronger in the digital environment, where the pace of technological advances is continuously increasing and the complexity of identifying a single solution that pleases everyone is becoming ever more problematic.

A. LEGISLATIVE LAG

With the advent of Internet and digital technologies, society has evolved towards what is commonly referred to as the ‘information society’ - a society in which the production of knowledge and information has become one of the main prerogatives. On the one hand, the trading and the marketing of information goods have been assuming an ever more important role in the world’s economy of today. On the other hand, the development of electronic commerce came along with a series of new marketing techniques that had a significant impact upon the everyday life of consumers. New laws, therefore, had to be enacted - and old laws had to be reformed - in order to regulate this new aspect of society.

In particular, in view of the inherent characteristics of digital works, the costs of producing and disseminating information have been drastically reduced. The advent of digital technologies and the worldwide deployment of the Internet network have made it possible for anyone (be it an individual, a group of individuals, a particular organization or a large corporation) to produce content in digital format and to distribute it almost

¹⁴⁵ See e.g. the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society, whose recital 30 states that the copyright may be transferred, either assigned or subject to the granting of contractual licenses, without prejudice to the relevant national legislation on copyright and related rights.

instantaneously to a global audience.¹⁴⁶ While this represents an obvious advantage for many content producers, it also constitutes an important danger that could eventually jeopardize the commerce of digital works. The increasing level of copyright infringement that takes place on the Internet is in fact likely to impinge upon the activities of both content producers and content providers.¹⁴⁷ In order for the commerce of digital works to be viable, a series of legislative reforms may be required to provide right holders with a stronger level of protection against online piracy.

The problem is, however, that constant legislative reforms have to be implemented in order to keep up with the pace of technological advances. Indeed, in view of the continuous evolution of digital technologies, whatever legal rule may have been adopted today is likely to become obsolete in the near future. Besides, while technological changes can increase the need for legislative reforms, they do not necessarily require them. Whether or not technological progress is such as to require an actual change in the law is likely to depend on many factors, such as e.g. the degree of inadequacy of the current legal system, the costs of a potential legal transition, and the extent to which the new legal system is likely to fit with the new state of affairs. As a general rule, the presumption should be for the preservation of the old legal order. However, to the extent that the traditional legal rules are no longer satisfactory, technological advances can be used as a pretext to require an actual reform to the legal system. Conversely, insofar as the current law still qualifies as reasonable body of law, any legislative reform would be unnecessary since technological advances could theoretically be addressed by way of contractual provisions.¹⁴⁸ In particular, given that any legislative reform could actually

¹⁴⁶ Digital technologies have drastically reduced the costs of content creation. Faster computers with better storage facilities and ever more sophisticated electronic devices (such as digital cameras, sound recorders, video recorders, etc) are becoming progressively more affordable and easy to use. Software applications are also being developed into much more accessible and user-friendly tools, for anyone to create and/or edit content without any specialized knowledge. Besides, with the deployment of Web 2.0 technologies allowing anyone to post content on the Internet, users have now the opportunity to publish their own content without engaging into any additional investment. For a general overview, see: RONTE, H. (2001) The impact of technology on publishing. *Publishing Research Quarterly*, 16.

¹⁴⁷ The advent of digital technologies and the establishment of the Internet network have had a strong impact on the distribution of content. As a result of digital technologies, content can in fact be reproduced immediately and at very low costs, as the process of digitization allow for making of a copy which is identical to the original in every aspect. In addition, technologies such as peer-to-peer and file-sharing have recently been developed in order to provide for the widespread diffusion of digital content in a way that is particularly difficult to monitor. Accordingly, in the entertainment industry, it is often argued that the advent of digital technologies has generated a massive amount of Internet piracy which ultimately contributed to reducing the sale of a variety of content providers, while simultaneously constituting a barrier to entry to the online distribution of content. In particular, on the grounds that the online distribution of digital content is likely to be jeopardized by the excessive number of users engaging in copyright infringement, a large number of copyright owners claim that it has therefore become necessary to reinforce copyright law in order to address the challenges of the digital environment. See e.g. DUCHENE, A. & WAELBROECK, P. (2005) Peer-to-peer, piracy and the copyright law: implications for consumers and artists. IN TAKEYAMA, L., GORDON, W. J. & TOWSE, R. (Eds.) *Developments in the economics of copyright: research and analysis*. Edward Elgar Publishing.

¹⁴⁸ Whether new technological advances require a reform of the old legal system is a question of contingent circumstances. As a general rule, whenever private property rights are adequately set up so as to be flexible enough to adapt to a new situation, technological changes do not require any change in the legal rules, in that private solutions, such as, for instance, the alteration of standard contractual terms, will be sufficient to adjust the legal framework to the new state of affairs. See, e.g. EPSTEIN, R. A. (1998) Before Cyberspace: Legal Transitions in Property Rights Regimes. *Chicago-Kent Law Review*, 73.

constitute a hindrance to the development of alternative solutions from the private sector, extreme caution is required in the making of a legislative framework capable of regulating such a variable and unpredictable medium as the Internet.¹⁴⁹

Yet, caution does not necessarily imply inertia: where the law may retreat, private ordering may come forward. If the problems concerning the distribution of creative works in the digital environment cannot be immediately resolved through the law, they may nonetheless be addressed by the means of private regulation. Even though the copyright regime has not been specifically designed for the digital environment and may sometimes be difficult to implement by analogy, the content of the law is nevertheless appealing to a majority of right holders. As opposed to the physical world, however, in the digital environment, ensuring an adequate amount of economic rewards to the authors of any original work of authorship might be difficult to achieve by virtue of the law alone. Although they ultimately rely upon the underlying copyright regime, private mechanisms of regulation have therefore been implemented in order to complement the function of the law. Indeed, contractual agreements and technological measures of protection are likely to be more effective than the standard provisions of the copyright regime in preventing the unauthorized reproduction and dissemination of digital content on the Internet.¹⁵⁰ Content providers are therefore likely to assume an increasingly predominant role in controlling the manner in which the access to and/or the use of information should be regulated on the Internet.

In recent years, the role of the private sector has increased in many sectors of the economy - including the entertainment industries, where private regulation is progressively replacing the role of public regulation by national regulatory regimes. As major companies and corporations are getting more and more involved in the regulation of their specific area of business, the private sector has become a primary source of rules, standards and social norms. In particular, given the difficulties for national governments to cooperate in order implement proper legislation at a rapid pace and on a global scale, the role of the private sector has become predominant in the regulation of a world economy characterized by global coverage and rapid technological change.¹⁵¹

¹⁴⁹ In view of the constantly evolving nature of the digital environment, it may still be too early for the implementation of a proper regulation of cyberspace. As digital technologies are still evolving and the potentialities of the Internet medium have still to be exhaustively explored, a strict regulation of the cyberspace may eventually hurt its development. See LESSIG, L. (1995) The path of cyberlaw. *Yale Law Journal*, 104, 1743-1755.

¹⁵⁰ In the digital environment, private regulation based on contracts and technological measures of protection is likely to be much more effective than public regulation based on the provisions of the copyright regime. The economic interests of rights holders can in fact be protected by private mechanisms which may not only be more effective than copyright law in the fight against copyright infringement, but may also entail fewer transaction costs, greater economic efficiency and a more egalitarian system for regulating access to intellectual property. For more details, see FISHER, W. W. (1998) Property and Contract on the Internet. *Chicago-Kent Law Review*, 73, 1203-1211.

¹⁵¹ See, HAUFLE, V. (2001) *A Public Role for the Private Sector: Industry self-regulation in a global economy*, Carnegie Endowment.

B. COPYRIGHT AS DEFAULT RULE

The exploitation of any copyright work is achieved through the transfer or the licensing of rights to any third party interested in commercially exploiting or otherwise making use of that work. Copyright licenses generally involve the granting of one or more exclusive rights to the respective licensees who become henceforth entitled to exercise these rights with regard to any copy of the work, only subject to the eventual restrictions stipulated by the licensor.

In the digital environment, however, the licensing of digital works considerably differs from the standard licensing practices which have been so far employed for the licensing of works in the physical world. In particular, one important distinction is that, as opposed to the physical world, where users generally acquire the property over an actual copy of the work, in the digital environment, instead, users only acquire the license to use that particular copy of the work for some predefined purpose. As opposed to the standard transfer of ownership, licensing agreements are framed in such a way as not to grant any proprietary right in a work¹⁵² - except for the exclusive licensing of rights which may under certain circumstances be regarded as an outright assignment of rights.¹⁵³ Under non-exclusive licensing schemes, however, users generally only obtain the right to access and eventually exploit a work but not the right to own and to freely dispose of the purchased copy (item).

Other relevant differences subsist, not only with regard to the way in which the license is being conveyed to the users, but also with reference to the nature and scope of the various terms and conditions stipulated within the copyright license, as well as to the mechanisms employed to enforce those terms. For instance, mass-market licenses have emerged as a standard way of licensing copyright material on the digital environment.

¹⁵² When the copyright owner assigns one of the exclusive rights to a third party, the latter becomes the new owner of the right and the former copyright owner can no longer exercise any form of control over the exploitation of that right. Conversely, if the copyright owner merely licenses an exclusive right to a third party, the former maintains the ownership of the right but allows the third party to perform an act that would otherwise amount to copyright infringement. As opposed to an assignment of rights, the licensing of rights therefore entitles the copyright owner to maintain complete control over the manner in which the third party can exploit that right. For a more detailed analysis of the distinction between the transfer of ownership and the licensing of rights in the context of copyright Works in the digital environment, see e.g. DAVIS, R. (2001) The Digital Dilemma. *Communication of the ACM*, 44, 77-83.

¹⁵³ While not every exclusive license can be regarded as an assignment of rights, whenever an exclusive license is unconditional and do not incorporate any supplementary reservations, it should be then regarded as being equivalent to an assignment of rights, in spite of the fact that it may actually purport to be a license. See e.g. *Waterman v. Mackenzie*, 138 U.S. 252 at 256, 11S.Ct. 334 (1891). Moreover, whenever an exclusive license requires the payment of royalties, although it may not constitute an assignment as such, the license can nevertheless be regarded as being equivalent to an assignment on a royalty basis. See e.g. *Dwight and Lloyd Sintering Co. v. American Ore Reclamation Co.*, (D.C. N.Y. 1937) 44 F. Supp. 391, according to which "There is no valid distinction in principle between an assignment or conveyance and the exclusive license before the court. In each the entire fate of the subject of the assignment or license is in the hands of the grantee. Nor does the provision for a minimum royalty payable [...] affect the conclusion." For more details on the analogy between the assignment and the licensing of rights in Intellectual Property, see HUESCHEN, G. W. (1951) Patents: Exclusive Licenses: Licensor and Licensee Relationship: Licensee's Obligations. *Michigan Law Review*, 49.

Although originally elaborated for computer software under the form of shrink-wrap licenses,¹⁵⁴ mass-market licenses have nowadays been adopted for the licensing of information goods through the introduction of click-wrap licenses and web-wrap licenses.¹⁵⁵ One advantage of mass market licenses over negotiated license agreements is that they eliminate the transaction costs that would otherwise be incurred from entering into negotiations with every user who requests access to a given piece of content.

As a general rule, digital technologies can therefore be regarded either as a challenge or as an opportunity to achieve a broader dissemination of content over the Internet network.¹⁵⁶ According to the perspective that is taken into account, different mechanisms have been adopted in order to regulate the manner and the extent to which copyright works can be accessed and/or exploited in the digital environment.

In particular, in line with the principles of freedom of contract, the default level of protection provided by the copyright regime can theoretically be complemented and/or eventually superseded by contractual means,¹⁵⁷ whose provisions may sometimes be enforced by technological measures.¹⁵⁸ Even though a copyright license is

¹⁵⁴ Shrink-wrap licenses have become an integral part of software transactions as a result of computer programs turning into a commodity. The term refers to the transparent plastic wrapping commonly employed to seal the software package on which the license has been written, so that users could read the terms and conditions before tearing it apart. The opening of the package constitute proof of acceptance and the user will consequently be bound by the terms of the license. For an analysis of shrink-wrap licenses, see: LEMLEY, M. A. (1995) Intellectual property and Shrinkwrap Licenses. *Southern California Law Review*, 68.

¹⁵⁵ Click-wrap licenses appear on the screen of the computer during the installation of a digital product (e.g. computer software or other information good) which cannot be enjoyed or exploited before the user agrees on the licensing terms. Web-wrap licenses subsist instead directly on the website where the user request access to the content, which will be transmitted only upon agreement with the terms and conditions. For more details, see HILLMAN, R. A. & RACHLINSKI, J. J. (2001) Standard-Form Contracting in the Electronic Age. Cornell Law School

¹⁵⁶ On the one hand, the Internet can be seen as a threat to the traditional business models which have been employed so far by the content industry, as it encourages users to by-pass the market so as to acquire the content illegitimately on the Internet network, thereby leading to an obvious decrease in the sales of physical products without necessarily increasing the sales of online content. On the other hand, however, the Internet can also be regarded as an important channel of distribution and as an extremely valuable marketing tool which is likely to create many new opportunities for the online distribution and the widespread dissemination of content. In fact, in the digital environment, the production and the distribution of content is based on a much more flexible and modular organization, where authors may assume the role of producers and publishers, and consumers can themselves contribute to the production and the dissemination of the final product. For more details on the impact of the Internet on the development of new business models in the content industry, see: KRUEGER, C. C. & SWATMAN, P. M. C. (2005) The Impact of Internet Technology on the Online Content Sector: Value Webs in online news and music. *Building Society through E-Commerce*.

¹⁵⁷ In contrast with the *numerous clausus* principle in property law, contract law allows for the exercise of a higher level of discretion in defining the terms and conditions a contractual relationship shall be based upon. When licensing a work by the means of a contractual instrument, the contracting parties can therefore autonomously determine the various terms and conditions under which the work may or may not be exploited: not only can they specify the exact subject matter of the transaction, but they may also introduce additional rights and obligations which have not been provided for by the relevant intellectual property laws. Enforcing the terms and conditions under which a creative work has been licensed may thus eventually be more a matter of contract law than a matter of copyright law. See MERGES, R. P. (1997) The End of Friction? Property Rights and Contract in the 'Newtonian' World of On-Line Commerce. *Berkeley Technology Law Journal*, 12.

¹⁵⁸ Since controlling the manner in which a digital work is being exploited may be virtually impossible in the digital environment, the legal protection provided by copyright law and contract law might be insufficient to ensure that users actually respect the various

rooted within the provisions of copyright law, it is in fact ultimately governed by contract law.¹⁵⁹ A license may thus include a number of provisions that aim at expanding the scope of the copyright regime (e.g. proprietary licenses constraining the exploitation of works beyond the boundaries of copyright law) or at diminishing its negative impact upon the dissemination of works (e.g. Open Content licenses promoting free reproduction and distribution of copyright works). Regardless of the fact that they modify the standard level of protection granted under copyright law, these licenses should nonetheless be regarded as valid and legally enforceable long as their terms and conditions do not conflict with any specific provisions of contract law or other relevant bodies of law (e.g. copyright law, competition law, etc).¹⁶⁰

Before entering into a thorough examination of their respective advantages and drawbacks, it is however necessary to engage into a preliminary analysis of the various instruments available to the private sector for the regulation of content on the Internet network. Yet, there exist today so many ways of dealing with copyright works in the digital environment that a systematic review of every possible approach may prove to be unfeasible. Instead, it may be useful to examine different approaches according to three lines of analysis, namely: the amount of contractual restrictions incorporated within the license (e.g. proprietary licenses with a large number of restrictions often going beyond the scope of the copyright regime vs. more liberal licenses whose main purpose is to eliminate some of the restriction that are implemented by default within the copyright regime), the use of particular technological measures in order to prevent the unauthorized exploitation of copyright works and/or to facilitate the administration of the rights vesting therein (e.g. technological measures of protection specifically meant to enforce the terms and conditions of the license or digital right management systems designed to control and to process the licensing of rights), and, finally, the amount and the type of consideration requested (e.g. the price to pay and/or the various obligations which have to be fulfilled in return of the right to perform a particular exploitation of the work).

terms and conditions under which the work has been licensed. Before making their works available on the Internet, a number of copyright owners may therefore decide to adopt particular measures of protection so as to enforce some of the provisions of the licensing agreement by technological means. See ESKICLOGLU, A. M. (2004) Protecting Intellectual Property in Digital Multimedia Networks. *Computer*, 36.

¹⁵⁹ Copyright law is aimed at creating a series of property rights in an original work of authorship, but after the rights have been granted, copyright owners can freely dispose of their exclusive rights, subject to the common rules and principles of property law and contract law. Essentially, the role of copyright law is that of establishing a proper framework for right holders to subsequently dispose of their rights as they see more fit. EASTERBROOK, F. H. (2005) Contract and Copyright. *Transactions, Information and Emerging Law*.

¹⁶⁰ The principle of freedom of contract allows private parties to enter into any sort of contractual agreements, but only as long as the provisions of the contract do not conflict with any other legal rule. As a general rule, the copyright owner may thus stipulate a contract that expressly eliminates one or more copyright limitations and the contract will be legally enforceable as long as it possesses all the requisites of validity and enforceability. However, as a matter of copyright law, certain characteristics of the copyright regime may not be overruled by contractual means, such as the inalienability of moral rights in most civil law jurisdictions (see e.g. Art. L. 121-1 of the French Code de la propriété intellectuelle), the mandatory character of certain copyright exemptions for computer software which cannot be eliminated by contract (see e.g. article 9 of the European Directive 91/250/EEC on the legal protection of computer programs, section 296A of the UK Copyright, Designs and Patents Act of 1988, section 47H of the Australian Copyright Act of 1968). Moreover, in the US the doctrine of copyright misuse prevents copyright owners from licensing a work under restrictive terms and conditions so as to secure a privilege that goes beyond federal copyright law and is contrary to public policy (*M. Witmark & Sons v. Jensen*, 80 F. Supp. 843 (D. Minn. 1948)).

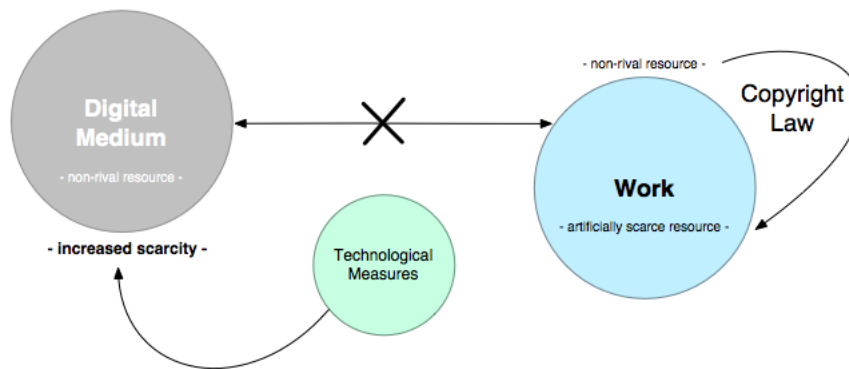
From a practical standpoint, most of the combinations that are currently employed for the licensing of digital works can be regrouped into two broad categories. On the one hand, there is the Digital Right Management (DRM) systems approach,¹⁶¹ which consists in licensing a work under very restrictive provisions and in combination with technological measures of protection. This approach has become standard practice in many commercial settings in a majority of activities concerned with the distribution of digital content under a proprietary format. On the other hand, there is the Open Content approach,¹⁶² which consists in licensing a work under very liberal terms and conditions and in exchange of no consideration. This has become ordinary practice in the context of many non-commercial initiatives interested in encouraging individual participation in the making of collaborative works and in achieving the broadest dissemination of works.

Digital Rights Management systems and Open Content licenses are being increasingly employed for the release of copyright works into the digital environment. Although they rely upon two divergent approaches, both are ultimately aimed at refining the default rule of the copyright regime so as to make it more consistent with the new framework established by Internet and digital technologies.

If copyright law can be regarded as an attempt by the State to realign the intangible properties of the work with the properties of the physical medium into which it has been conveyed to the public, private ordering is an attempt to realign the legal attributes of the work with the physical attributes of the medium, in a world in which the medium has become inherently digital.

¹⁶¹ DRM systems are basically intended to provide a secure distribution platform for digital content through the deployment of particular technological measures. There exists however no generally accepted definition of what exactly constitutes a DRM system. The term may cover a wide range of different technologies, from the most basic copy-protection mechanisms to the most sophisticated technologies covering both the distribution and the subsequent exploitation of digital content. For a comprehensive overview of the technological aspects of Digital Rights Management systems, see chapter 2 in BECKER, E., BUHSE, W., GÜNNEWIG, D. & RUMP, N. (2004) *Digital Rights Management: Technological, Economic, Legal and Political Aspects*, Springer.

¹⁶² The term has first been conceived in 1998 by David Wiley, founder of the Open Content project and drafter of the Open Content License together with Eric Raymond and Tim O'Reilly. Although the project has now been discontinued, the term has nevertheless survived and has today acquired a more general meaning which encompasses certain typologies of copyright licensing agreements which are designed to increase the liberties of end-users. In order to guarantee the free availability of knowledge, Open Content licenses eliminate some of the restrictions on the reproduction and the distribution of works that are imposed by default by the copyright regime. Additionally, Open Content licenses may also include particular provisions allowing for free exploitation of a work (although sometimes limited to non-commercial purposes) as well as the making of derivatives works. For a general overview of the different typologies of Open Content licenses, see LIANG, L. (2004) *Guide to Open Content Licenses*. Piet Zwart Institute.



DRM systems employ various technological mechanisms to regulate the reproduction and the distribution of a work, but also to administrate the various rights and obligations pertaining to a particular user of the work. They can dynamically respond to any user's request by either preventing or allowing a particular exploitation of the work and by ensuring that exploitation be permitted only after the user has paid the necessary fees.

As such, DRM systems are used to replicate the properties of private goods into the digital realm. This is accomplished by creating technical excludability by means of specific technological measures of protection aimed at preventing the unauthorized access to a work,¹⁶³ and artificial scarcity by means of specific hardware or software devices intended to preclude the illegitimate reproduction of the work and any further distribution thereof.¹⁶⁴ By reconciling the properties inherent to the digital instance of a work with the properties that

¹⁶³ Content providers may be reluctant to release their content on the Internet unless they can avail themselves of a reliable mechanism allowing them to specify certain access conditions and to preclude any unauthorized access to the content. There exist today a large number of access restriction mechanisms, the most common of which are based on encryption and watermarking technologies. For a general overview, see e.g. ESKICIOGLU, A. M. & DELP, E. J. (2001) An overview of multimedia content protection in consumer electronics devices. *Signal Processing: Image Communication*. Elsevier. One of the most widespread technologies used to restrict the access to digital content is perhaps the Content Scramble System (CSS), which is used to encode the content of a majority of commercial DVDs is one of the most widespread technologies used to restrict the access to digital content. Limitations may also relate to the time period and/or to the number of times a digital file can be accessed (see e.g. Apple iTunes Movie Store, which gives users a period of 30 days for watching a movie, automatically reduced to a period of 24 hours after the movie has first been played) or to the manner in which the file can be exploited (see e.g. Adobe Acrobat Reader, which may prevent users from printing and/or modifying a document, as well as most DVD playback devices, which may disable certain operations - such as fast forwarding during commercial - if so requested by the content provider). Moreover, tethering systems may be introduced in order to limit the number and/or the type of devices capable of accessing a given digital file (see e.g. Apple iTunes' policy, which imposes a limit upon the number of devices on which a given digital file can be played; Adobe Acrobat's activation, which is absolutely required for the users to be able to view and/or share technologically protected PDF files; and the CSS region-coding feature, which prevents any DVD player released into one particular region from displaying a DVD which has been released for a different region).

¹⁶⁴ See e.g. BECHTOLD, S. (2004) Digital Rights Management in the United States and Europe. *The American Journal of Comparative Law*, 52. The CSS technology, for instance, although originally conceived as an access-restriction mechanism, has also been employed to indirectly prevent the unauthorized exploitation of a work, by licensing the technology necessary to decrypt the content of an encrypted DVD only to the producers of playback devices that would agree to incorporate particular restrictions against the illegitimate reproduction thereof. IEEE (1999) Copy Protection for DVD Video. *Proceedings of the IEEE*, 87. See also the security measures developed by RealNetworks Inc. in order to protect content against unauthorized copying, which consist of (1) the Secret Handshake, to ensure that the content on a RealServer will only be streamed to a RealPlayer, and (2) the Copy Switch, which

every original work of authorship has been granted under copyright law, DRM systems may therefore greatly facilitate the trading of digital works.

On the negative side, DRM systems are usually employed in the framework of particular licensing schemes, where what is being sold is not the digital instance of a work but only the right to use the work under the specific terms and conditions of the license.¹⁶⁵ Moreover, the provisions of many end-user licensing agreements (EULAs) are likely to feature a number of restrictions that extend beyond the scope of the copyright regime,¹⁶⁶ so that the properties of the work and of the digital manifestation thereof may end up being once again misaligned. Yet, while it may not be feasible to reproduce the self-regulating feature of the copyright regime in the digital environment, it may nevertheless be possible to create a self-enforcing regime through a combination of contractual and technological measures that would fundamentally preclude users from making use of any digital work unless they specifically comply with the terms and conditions of the licensing agreement.

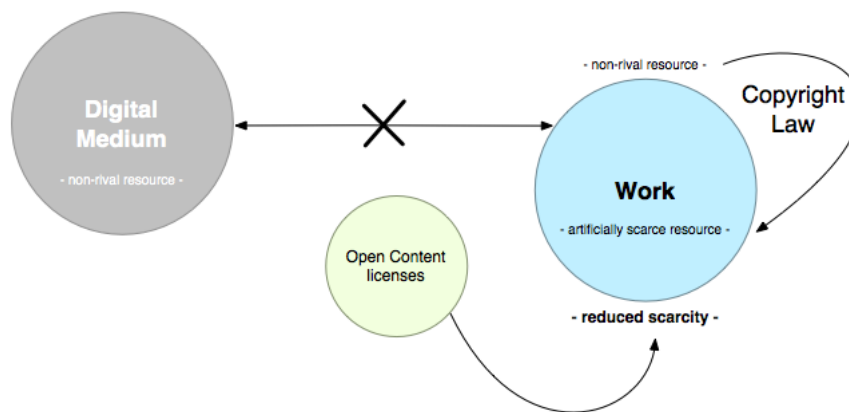
The restrictive nature of proprietary licenses and the corresponding technological measures of protection by which their terms and conditions are technologically enforced have been progressively counterbalanced by the liberal character of an emerging type of licenses: the so-called Open Content licenses, which are principally aimed at increasing the freedom of end-users. All Open Content licenses endorse the free reproduction and the widespread distribution of works, but a large number of them also promote the free exploitation thereof for commercial and/or non-commercial purposes.¹⁶⁷

incorporates the content owner's preferences with regards to whether or not the user shall be entitled to save a copy of the content that is being streamed. *RealNetworks, Inc. v. Streambox, Inc.* (2000) W.D. Wash. Jan. 18, 2000.

¹⁶⁵ Licensing agreements are generally framed in such a way as not to grant any proprietary right in a work, except in the case of the exclusive licensing of rights which may under certain circumstances be regarded as an outright assignment of rights. See e.g. *Waterman v. Mackenzie*, 138 U.S. 252 at 256, 11 S.Ct. 334 (1891), according to which, whenever an exclusive license is unconditional and do not incorporate any supplementary reservations, it should be regarded as equivalent to an unqualified assignment of rights, in spite of the fact that it may actually purport to be a license. Under a non-exclusive licensing scheme, instead, users generally only obtain the right to access and eventually to exploit a work, but not the right to own and to dispose freely of the work. Accordingly, as opposed to a standard transfer of ownership, the licensing of rights enables the copyright owner to maintain control over the manner in which and the extent to which the third parties can exploit these rights.

¹⁶⁶ Copyright owners can release their works under very restrictive terms and conditions which are likely to extend beyond the scope of the copyright regime and which may eventually bypass some of the statutory limitations of copyright law. The license may also be supported by a variety of technological measures of protection specifically designed to automatically enforce a number of contractual provisions. The exploitation of a work in the digital environment is therefore ultimately governed by private ordering, implemented by the various terms and conditions of the license, together with the supplementary restrictions introduced and automatically enforced by technological means. For more details, see ELKIN-KOREN, N. (2001) *The Privatization of Information Policy. Ethics and Information Technology*, 2.

¹⁶⁷ Various reasons may justify the development of Open Content licenses, even though the ultimate objective is always that of ensuring that a work remains accessible to all. In order to guarantee the free availability of knowledge, Open Content licenses eliminate the unnecessary restrictions on the reproduction and the distribution of works that are imposed by default by the copyright regime. Additionally, Open Content licenses may also include particular provisions allowing for free exploitation of a work (although



Open Content licenses are essentially aimed at realigning the properties of the work with those of the digital manifestation thereof.¹⁶⁸ The goal is to reintroduce some of the public good characteristics originally pertaining to the work by reducing the scope of copyright protection that every author has been granted with. As such, Open Content licenses are designed to encourage the free reproduction of a work. While the distribution and/or the making available of the work may sometimes be subject to certain requirements of form, Open Content licenses cannot impose any restrictions upon the distribution and/or the making available of a work.¹⁶⁹

sometimes limited to non-commercial purposes) as well as the making of derivatives works. For a general overview of Open Content licenses, see LIANG, L. (2004) Guide to Open Content Licenses. Piet Zwart Institute.

¹⁶⁸ Open Content licenses allow copyright owners to release their works under a scheme where only some rights are reserved: a level of protection that lies in between the extensive protection of the copyright regime, where almost all rights are reserved, and the negative protection of the public domain, where no rights are reserved. A situation with only some rights reserved is supposed to constitute an appropriate balance between these two extremes. See Creative Commons (2007) Some Rights Reserved: Building a Layer of Reasonable Copyright, www.creativecommons.org

¹⁶⁹ See e.g. the Open Knowledge definition at <http://www.opendefinition.org> and the definition of the Free Cultural Works at <http://freedomdefined.org>. On the other hand, Open Content licensing also eliminate the artificial excludability established by copyright law and/or technological means. For instance, Certain Open Content licenses are incompatible with the application of technological measures of protections to the extent that they prevent or restrict the access to and/or the legitimate exploitation of a work (see e.g. the Creative Commons licenses), whereas others are incompatible with the application of any technological measures of protection as such, whether or not they have been designed to prevent or restrict the legitimate exploitation of a work (see e.g. the Anti-DRM license and the GNU Free Documentation License). Moreover, a number of Open Content licenses expressly preclude the commercial distribution of a work (see e.g. the non-commercial clause of the Creative Commons licenses), so that access to the work may not be conditional to the payment of a fee. Besides, even where the commercial exploitation of a work is allowed, the terms and conditions of the license, according to which the work can be freely reproduced and redistributed to anyone, cannot be modified by the licensee (see e.g. article 4(a) of the Creative Commons licenses: "You may distribute, publicly display, publicly perform, or publicly digitally perform the Work only under the terms of this License") and the majority of Open Content licenses generally prevent the licensee from imposing further restrictions on the rights granted by the license (see e.g. article 4(a) of the Creative Commons licenses: "You may not offer or impose any terms on the Work that alter or restrict the terms of this License or the recipients' exercise of the rights granted hereunder"). All users subsequently coming into possession of the work will therefore be entitled to redistribute the work for free, whether or not they originally had to pay for it.

Although they ultimately rely upon the copyright regime, Open Content license are employing the law to create a series of positive rights (as opposed to the traditional exclusive rights) to ensure the public availability and the free dissemination of content.¹⁷⁰

Open Content licenses differ from standard copyright licenses to the extent that they usually attempt to get rid of certain proprietary rights granted under the copyright regime by licensing to anyone the right to exploit a particular work according to specific terms and conditions, without any kind of consideration to be given in return. The problem is, however, that the license does not actually attach to any particular instance of the work but only to a particular user thereof.¹⁷¹ A new license has therefore to be created every time the item is being transferred to a new user.¹⁷² Despite the simplicity of the operation, it is likely to result into the formation of a complex network of contractual relationships which is likely to increase the degree of legal uncertainty that is already associated with the enforcement of these licenses.¹⁷³

Accordingly, while both DRM systems and Open Content licenses may eventually succeed in reducing the level of discrepancy existing between the legal characteristics of the work as an abstract and intangible entity and the physical characteristics of the digital medium into which it is being conveyed to the public, they both have to face a number of challenges which may prevent them from entirely restoring the self-regulatory feature of the copyright regime in the digital environment.

¹⁷⁰ Intellectual property rights can be used negatively in order to restrict the exploitation of a work, or positively in order to enable the free dissemination of works and to promote the social contribution to the cultural heritage. Such a framework benefits both users, who can enjoy a broader availability of works, and right holders, whose rights remain protected by Intellectual Property laws so that no one may exploit a work in any manner which has not been specifically provided for. See AIGRAIN, P. (2003) Positive Intellectual Rights and Information Exchange. IN CENTURY, M. (Ed.) *CODE*. MIT Press.

¹⁷¹ As a proprietary right, the copyright in a work endows the copyright owner with a set of rights which can be enforced against third parties. Conversely, a contractual agreement only exists when there is *privity* amongst the parties, and any contractual obligation may therefore only be enforced against those parties who have previously agreed to the terms and condition of the contract. Consequently, although the copyright owner may introduce a number of restrictions on the possibility for the licensees to redistribute a work, the licensor has however no authority over any sub-licensees and can thus only enforce the contract through the intermediary of the particular licensee to whom the work has been originally licensed. Accordingly, any contractual provision restraining the power of a licensee to sublicense a work may only be enforced against that licensee. If the licensee breaches the contract and sublicense the work under more lenient terms and conditions than those originally stipulated by the licensor, however, the licensor has no authority under contract law to enforce the terms and conditions of the original license against any subsequent licensees, although the owner of the copyright in the work may nevertheless take action under copyright law whenever the copyright in the work has been infringed. See MERGES, R. P. (1997) The End of Friction? Property Rights and Contract in the 'Newtonian' World of On-Line Commerce. *Berkeley Technology Law Journal*, 12.

¹⁷² Note, however, that in order to facilitate the maximum dissemination of works, Open Content licenses automatically grant a new license to anyone that come into possession of the work regardless of the approval of the licensor (see e.g. article 8(a) of the Creative Commons licenses, according to which every time a licensee distributes or publicly digitally performs the work, the licensor offers to the recipient a license to the work on the same terms and conditions).

¹⁷³ For more details concerning the legal uncertainty with regard to the validity or the enforcement of Open Content licenses and the various legal issues it is likely to entail, see *infra* Part I. Chapter 4: Private Regulation: Open Content. Section 4: Problems.

A number of technological and legal challenges exist, which could eventually jeopardize the long-term sustainability of both licensing practices. In particular, while they are both likely to provide a series of advantages and disadvantages to either right holders or end-users, the extent to which they have been acknowledged by the law is different. While, as a result of the WIPO Copyright Treaty, the deployment of DRM systems has been expressly endorsed by the legislative reforms of the copyright regime, the validity and enforceability of the contractual agreements that they generally come with (e.g. shrink-wrap or click-wrap licenses) cannot however be guaranteed to the extent that they might actually run counter to the provisions of other bodies of law. Moreover, nothing in the Treaty actually addresses any of the issues related to Open Content licensing.

So far, their legal status has not yet been formally recognized by any jurisdiction, with the exception of the French Code which explicitly acknowledges the validity of a copyright license even when it does not involve any type of consideration.¹⁷⁴ The general validity of most Open Content licenses has yet to be ascertained and the enforceability of their corresponding terms and conditions is still open to debate, mostly because there have been so far only a few judicial precedents addressing the actual legal status of Open Content licenses.¹⁷⁵ This notwithstanding, the validity of the Creative Commons licenses has recently been addressed in Spain first in the case of *SGAE v Luis* (Audiencia Provincial de Pontevedra, Sentencia de 29 Nov. 2005, rec. 3008/2005), where the court held that the licenses were invalid because they lacked a signature, and later in the case of *SGAE v Fernandez* (Juzgado de Primera Instancia de Badajoz, Procedimiento Ordinario 761/2005, Sentencia N. 15/2006), where the court eventually acknowledged the efficacy of the licenses as a valid legal instrument, although the court did not further investigate upon their legal nature. Moreover, in the Netherlands, not only did the case of *Curry v Audax* (District Court of Amsterdam, Case no. 334492 / KG 06-176 SR) confirm the validity of the Creative Commons licenses, but it also endorsed the enforceability of their corresponding terms and conditions. Whether any given Open Content license should be regarded as a bare license or as a contract remains however an important question, which may affect not only the manner in which the provisions of the license may be interpreted, but also the extent to which the various terms and conditions can be enforced and the nature of the remedies available upon breach.

¹⁷⁴ The French Copyright Code has recently been reformed as a result of the enactment of the DADVSI law (Law N.2006-961 of 1 August 2006 on copyright and related rights in the information society) and now specifically provides for the possibility to license the copyright in a work without any consideration to be given in return. See e.g. Article L.122-7-1 of the French Code de la propriété intellectuelle, according to which authors are free to make their works *freely available* to the public, subject to the rights of possible co-authors or third parties and in compliance with the agreement they have concluded (emphasis added).

¹⁷⁵ For more details on the difficulty to determine the legal status of Open Content licenses, see HIETANEN, H. (2007) A License or a Contract: Analyzing the Nature of Creative Commons Licenses. Helsinki Institute for Information Technology. For a more general overview on the legal status of Open Content licenses, see *infra* Part I. Chapter 4: Private Regulation: Open Content. Section 2: Legal status

PRIVATE REGULATION: TECHNOLOGICAL MEASURES

By allowing for the reproduction of digital content to be performed at very low costs and without quality loss, and to further allow for the distribution thereof to be achieved instantaneously and on a worldwide scale, Internet and digital technologies have revolutionized the way in which copyright works are being produced and the mechanisms by which they are being made available to the public in the digital environment. With the recent developments in Internet communication, together with the increasing consumption of digital content, a large number of opportunities have emerged for the commercial distribution of copyright works in the digital environment and an ever larger amount of commercial content is consequently becoming available on the Internet network.

Some right holders have been able to use these technologies to their own advantage. Internet and the digital technologies have in fact enabled the development of direct e-commerce, a new business scheme according to which digital content is entirely traded over the Internet and services are exclusively performed by electronic means. Direct e-commerce has a number of advantages over traditional commerce, the most important of which are (1) the availability of a global market place, (2) the significant reduction of logistic costs and transaction costs, and (3) the possibility to better respond to users' needs by way of product customization and price discrimination.¹⁷⁶ However, the majority of right holders suffered considerable losses from the extensive practice of copyright infringement that emerged on the Internet as a result of the new opportunities offered by digital technologies.¹⁷⁷

¹⁷⁶ For more information about the specific features and peculiarities of direct and indirect e-commerce, see *inter alia*: RAYPORT, J. F. & JAWORSKI, B. (2002) *Introduction to e-Commerce*, McGraw-Hill.; BAKOS, Y. (2001) The Emerging Landscape for Retail E-Commerce. *The Journal of Economic Perspectives*, 15.; CHOI, S. Y. & WHINSTON, A. B. (1999) The future of e-commerce: integrate and customize. *IEEE Computer*, 31.

¹⁷⁷ Before engaging into any type of copyright infringement, users must compare the benefit resulting from the infringing activity with the costs and risks of being caught. In the digital environment, copyright infringement is made particularly easy and convenient. Any user is itself an information provider, the costs of copyright infringement have been drastically reduced, the quality of infringing copies significantly increased, and the risks of being caught have considerably dropped (LEE, G. B. (1996) Addressing Anonymous Messages in Cyberspace. *Harvard Journal of Computer-Mediated Communication*, 2.). Besides, the public is generally uneducated about copyright law and does not necessarily regard the illegitimate reproduction and dissemination of data on the Internet as a criminal activity LITMAN, J. (1994) The Exclusive Right to Read. *Cardozo Arts & Entertainment Law Journal*, 13.). On the other hand, copyright enforcement on the Internet has become particularly difficult. As a result of network and media convergence, some provisions of copyright law may turn out to be obsolete (DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press.) and the discrepancies between national copyright systems combined with the international scope of the Internet which does not take account of national boundaries may introduce a series of challenges to the international resolution of copyright disputes (GOLDSTEIN, P. (2001) *International Copyright: Principles, Law, and Practice*, Oxford University Press.).

In the digital environment, in fact, the possibility to reproduce content at very low costs and to redistribute it instantaneously on a worldwide scale resulted into a situation in which even the private usage of a work is likely to have a significant impact upon the economic interests of copyright owners.¹⁷⁸ Hence, although traditionally intended to regulate the commercial exploitation of a work, nowadays, the vast majority of copyright licenses stipulated in the digital environment are ultimately addressed to end-users and are fundamentally intended to regulate the mere consumption of the work. Digital content is therefore increasingly being released under proprietary licenses whose terms and conditions purport to restrict the exploitation of the work and to impose contractual conditions upon the usage of the work which often exceed the standard provisions of the copyright regime.

In view of the inferior bargaining power of end-users, however, proprietary licenses are often very restrictive and only authorize a very limited exploitation of the work.¹⁷⁹ Even if they are primarily based on copyright law, the scope of these licenses may extend beyond the scope of the copyright regime¹⁸⁰ so as to regulate not only the reproduction, the modification and the dissemination of the work, but also the specific conditions governing the access and the usage thereof. Contractual agreements are acquiring an ever more important role for the transaction of information goods into the digital environment. In contrast to the *numerous clausus* principle of property law, transactions based on contract law allows for greater flexibility in defining the terms and conditions under which a good may or may not be exploited. Contracting parties have therefore a higher level of discretion in defining the terms and conditions their contractual relationship is based upon: not only can they specify the exact subject matter of the transaction, but they can also introduce additional rights and the obligations that have not been provided for by the relevant intellectual property laws.¹⁸¹ Enforcing the terms and conditions under which a digital work has been licensed may thus eventually become a matter of contract law rather than copyright law

¹⁷⁸ The exclusive rights of the copyright regime were originally conceived in order to protect the economic interests of the copyright owner by precluding competitors from commercializing a work for a limited period of time. In the digital environment, however, the economic interests of right holders may be seriously affected also by the non-commercial exploitation of works by end-users. In fact, although they are not in direct competition with the copyright owners, end-users may considerably reduce the marketability of a work by privately reproducing and redistributing it to their peers, a process which, if repeated a sufficient number of times, may progressively eliminate the incentives for anyone to purchase an original copy of the work. See ELKIN-KOREN, N. (1996) Public/Private and Copyright Reform in Cyberspace. *Journal of Computer-Mediated Communication*, 2.

¹⁷⁹ Copyright owners are entitled to license their rights in a work either in whole or in part, but they may also rely on contractual means in order to introduce additional restrictions and/or obligations on the exploitation of the work, which can be limited in time, in scope, in quantity, or in any way they see fit. For a general overview of copyright licensing practices in the digital environment, see, e.g. GIAVARRA, E. (1998) Copyright and licensing in the digital age. *Digital library and e-publishing for science and technology*. Tilburg.

¹⁸⁰ Instead of relying on copyright law, copyright owners are increasingly relying on licensing agreements in order to define and to protect their rights. Private ordering is taking priority over the provisions of copyright law, which are regarded as mere default provisions and can therefore be bypassed and/or expanded by standard contractual means. COHEN, J. E. (1998) Copyright and the Jurisprudence of Self-Help. *Berkeley Technology Law Journal*, 13.

¹⁸¹ For a discussion on the relationship between property rights and contracts, see e.g. MERGES, R. P. (1997) The End of Friction? Property Rights and Contract in the 'Newtonian' World of On-Line Commerce. *Ibid.* 12.

While they need not necessarily be combined with any particular technological measure of protection, the provisions of these licenses are unlikely to be deliberately followed without an additional layer of protection.¹⁸² In order to prevent users from breaching the terms and conditions of the licensing agreement,¹⁸³ as well as to reduce the difficulty for right holders to identify the users responsible for the breach¹⁸⁴ and to enforce their rights against every single infringer,¹⁸⁵ rights holders can use a variety of technological measures of protection.

Sophisticated DRM systems and technological measures of protection can ensure compliance with the provisions of the copyright license through automatic enforcement: users may no longer deviate from the terms of the license because the breach of any contractual provision is precluded by design. Technological measures of protection can exercise an ex-ante control over the exploitation of the work, thereby providing copyright owners with an almost absolute control over the manner in which their works may or may not be exploited.¹⁸⁶ Intended to safeguard the economic interests of right holders, this particular scheme of licensing may however be subject to a series of legal challenges concerning the validity and enforceability of certain contractual provisions. While they may be unenforceable as a result of the manner in which they are conveyed to the users, or to the extent that they are contrary to the provisions of other bodies of law, certain terms and

¹⁸² See ESKICLOGLU, A. M. (2004) Protecting Intellectual Property in Digital Multimedia Networks. *Computer*, 36.

¹⁸³ Copyright infringement is a function of the benefits deriving from an infringing activity and the costs of infringement (i.e. the costs incurred in performing the infringing activity plus the risks of being caught and punished). Accordingly, since the costs of creating and disseminating infringing copies have drastically dropped as a result of the digital technologies and the quality of infringing copies has significantly increased, the incentives for users to violate the terms and conditions of the copyright license are much higher in the digital environment, in particular, in view of the lower the risks of being caught. LEE, G. B. (1996) Addressing Anonymous Messages in Cyberspace. *Harvard Journal of Computer-Mediated Communication*, 2.

¹⁸⁴ In order to establish a communication between two parties, the architecture of the Internet network requires their respective network addresses to be known. The address of every user connected to the network can therefore always be determined by keeping track of the nodes to which the relevant packets are being transferred to. However, although the starting point and the ending point of a communication can always be ascertained, the content that is being communicated can be concealed by the means of particular encryption algorithms. Moreover, users may avail themselves of a number of technologies which are capable of reducing the traceability of the communication to different degrees (see e.g. the practice of content fragmentation, the use of anonymous proxies, or the employment of anonymous routing systems) which make it extremely difficult to identify who is communicating with whom. For a detailed analysis of the various opportunities for engaging in anonymous communication in the digital environment, see CLAESSENS, J., PRENEEL, B. & VANDEWALLE, J. (1999) Solutions for Anonymous Communication on the Internet. *International Carnahan Conference on Security Technology*.

¹⁸⁵ It is economically unsound for the copyright owners to sue end-users for the infringement of the copyright in their works, given the considerable complexity and the high costs involved in bringing an action for copyright infringement, as opposed to the relatively small amount of damages that could be derived from every individual infringer. LEMLEY, M. A. & REESE, R. A. (2004) Reducing Digital Copyright Infringement Without Restricting Innovation. *Stanford Law Review*, 20. However, lawsuits may increase the awareness of copyright law and act as a deterrent for future infringements, eventually leading to a situation where those who can afford buying content will buy it and those who cannot afford it will keep on infringing. See HUGHES, J. (2005) On the Logic of Suing One's Customers and the Dilemma of Infringement-based Business Models. *Cardozo Arts & Entertainment Law Journal*, 20.

¹⁸⁶ Technological measures of protection can be employed in order to turn a mere licensing agreement into a self-enforcing contract. See COHEN, J. E. (1998) Copyright and the Jurisprudence of Self-Help. *Berkeley Technology Law Journal*, 13.

conditions might also be considered unreasonable in view of the consequences they may have on the interests or the fundamental rights of end-users.

SECTION 1

TECHNICAL ASPECTS

In order to address the problem of copyright infringement, technological measures of protection (TPMs) and digital right management system (DRMs) have been combined together in order to restrict the access, the usage and the reproduction of digital content, as well as to enable the identification and the monitoring of every user's activities.

TPMs are anti-infringement measures that have been applied to a work in order to restrict the subsequent exploitation thereof. They generally consist of encryption technologies intended to prevent illegitimate access to digital content; copy protection mechanisms to prevent unauthorized reproduction; or technological measures limiting the period in which a particular digital file can be accessed or the manner in which it can be exploited.¹⁸⁷ Yet, technological measures do not necessarily have to be restrictive. TPMs may sometimes be employed with the mere intention of guaranteeing the integrity and the authenticity of data in combination with digital watermarks and digital signatures.¹⁸⁸ By incorporating the identity of the purchaser into digital files, digital watermarks and digital signatures can also be used to dissuade users from disseminating copies of a

¹⁸⁷ Content providers may be reluctant to release content on the Internet unless they can rely on a reliable mechanism to specify access conditions and prevent unauthorized access. For example, the Content Scramble System (CSS) used to encode the content of a majority of commercial DVDs is one of the most widespread technologies used to restrict the access to digital content. Although conceived as an access-restriction mechanism, the CSS could also indirectly prevent the unauthorized exploitation of a work, by licensing the technology necessary to decrypt the content only to the producers of playback devices that incorporate a series of restriction against illegitimate reproduction (IEEE (1999) Copy Protection for DVD Video. *Proceedings of the IEEE*, 87.). See also the security measures used by RealNetworks Inc. to secure content against unauthorized copying, which have been discussed in *RealNetworks, Inc. v. Streambox, Inc.* (2000)W.D. Wash. Jan. 18, 2000. Digital technologies also enable right holders to incorporate an unlimited number of restrictions into a digital file. Limitations may relate to the time period and/or number of time that the digital file can be accessed (see e.g. Apple iTunes Movie Store giving users a period of 30 days for watching a movie, automatically reduced to a period of 24 hours after the movie has first been played) or to the manner in which the file can be exploited (see e.g. Adobe Acrobat Reader which may prevent users from printing and/or modifying a document and most DVD playback devices which may disable certain operations such as fast forwarding during commercial if requested by the content provider).

¹⁸⁸ Digital watermarks are patterns of bits inserted into a digital file in order to provide information about that particular file. By providing a mechanism to verify the origin and the integrity of content, digital watermarks constitute an effective solution to the inherent manipulability of digital data, as well as to ascertain copyright ownership. See: MEMON, N. & WONG, P. W. (1998) Protecting Digital Media Content. *Communications of the ACM*, 41, VOYATZIS, G. & PITAS, I. (1999) The use of watermarks in the protection of digital multimedia products. *Proceedings of the IEEE*, 87. Similarly, digital signatures are a mechanism to ensure the integrity and the authenticity of digital content. Based on a two-key encryption algorithm (the data is encrypted with the content provider's private key and decrypted with the user's public key), digital signatures may ensure that the data has not been tampered with, since any type of manipulation would prevent the content from being decrypted. Moreover, when incorporated into digital content, digital signatures may also guarantee that the data comes from a particular source, see: LIN, C.-Y. (2000) Watermarking and Digital Signature Techniques for Multimedia Authentication and Copyright Protection. Columbia University.

legitimately purchased work on the Internet, where they could be discovered by specific tracking technologies.¹⁸⁹

DRM systems are a more advanced type of technology that implement all the necessary steps for the ultimate consumption of the work - from the initial negotiation of the terms and conditions, to the automatic enforcement thereof through the monitoring of user activity.¹⁹⁰ As a general overview, whenever a user requests access to a particular piece of content, the DRM client contacts the DRM server on which the work has been stored, which then informs the user of the terms and conditions under which the work has been released. Upon acceptance, the user becomes legally bound to the provisions of the licensing agreement, and - to the extent that it is technologically feasible - the terms and conditions of the copyright license are automatically enforced by specific technological measures of protection designed to prevent unauthorized access or usage of the content.¹⁹¹

Closely connected with the operation of DRMs is the concept of metadata, a particular set of information which constitutes an essential feature for the correct functioning of DRMs. While descriptive metadata refers to the general characteristics of a work, the function of legal metadata is to represent the terms and conditions of the copyright license in order to allow for any DRM system to subsequently identify the rights that any party holds with regard to that work.¹⁹²

In the music industry, a number of content providers have already adopted this model. Apple's FairPlay DRM from the iTunes Music Store is perhaps one of the most well known implementation of a comprehensive DRM

¹⁸⁹ Watermark tracking agents are specific software whose main purpose is to browse the Internet, search for digital files incorporating particular watermarks and report them to the relevant watermark dispatchers. The watermark dispatcher will subsequently communicate with the corresponding DRM server in order to determine whether appropriate actions are to be taken. For more details on the possible applications of digital watermarking technologies for the commerce of digital content, see: ZHAO, J. (1997) Applying Digital Watermarking Techniques to Online Multimedia Commerce. *Conference on Imaging Science, Systems and Applications*. Las Vegas.

¹⁹⁰ For a comprehensive overview of the technological aspects of Digital Rights Management systems, see chapter 2 at BECKER, E., BUHSE, W., GÜNNIEWIG, D. & RUMP, N. (2004) *Digital Rights Management: Technological, Economic, Legal and Political Aspects*, Springer.

¹⁹¹ Whenever a user purchase a DRM-enabled device and/or use it in order to request access to a particular work, the user is required to enter into a contractual agreement that stipulate the manner in which the work can be legitimately exploited and what are the respective rights and obligations of the user. As the contract is only binding upon the particular user that purchased the license, a user who obtained a pirated copy of the content would not be affected by any provisions that go beyond the scope of the copyright regime. With a properly designed DRM system, however, the terms and conditions of the license will nevertheless be enforced by technological means. See BECHTOLD, S. (2002) From Copyright to Information Law: Implications of Digital Rights Management. IN SANDER, T. (Ed.) *Security and Privacy in Digital Rights Management*. Berlin, Springer.

¹⁹² Rights Expression Languages (RELs) are an essential element of DRM systems. Ranging from very simple languages that are only capable of expressing the preferences of right holders to more sophisticated languages with very complex semantics that can be read and understood by specific DRM systems, all RELs ultimately purport to endorse compliance with the terms and conditions of a particular license, regardless of whether they can be enforced by technological measure. For a detailed overview of the similarities and differences of various Right Expression Languages, see: COYLE, K. (2004) Rights Expression Languages. Library of Congress.

system regulating the access to and the usage of digital songs.¹⁹³ Another popular example is that of Napster, which allows for the streaming of musical files according to a variety of different subscription schemes.¹⁹⁴ The video industry is currently expanding in the same direction. For instance, Apple's iTunes Movie Rental Store allows users to download digital movies which can only be watched for a determined period of time.¹⁹⁵ Netflix is another online movie rental store which offers a large collection of movies that can be streamed directly to the user's computer.¹⁹⁶ Finally, a DRM of more general application is the Windows Media DRM system developed by Microsoft, a technology licensed to a number of content providers in order to enable them to distribute DRM-protected media on the Internet.¹⁹⁷

¹⁹³ Apple iTunes Music Store is an online music store, where users can buy single songs or full albums in digital format. iTunes also provide users with personalized recommendation based on their previous purchases and give them the possibility to listen a 30-second preview of any song before buying it. The songs acquired on iTunes are released under a specific end-user licensing agreement and were originally protected by a particular DRM system (FairPlay DRM) allowing for the songs to be burnt on an unlimited number of CDs for personal use, to be transferred on an unlimited number of iPod players, but only to be played on a maximum of 5 computers at a time. Yet, iTunes has recently started to release their songs devoid any DRM protection which can be purchased for exactly the same price as the DRM-enabled version. For a general overview of Apple iTunes Music Store, see <http://www.apple.com/itunes/overview>

¹⁹⁴ Napster offer different types of services for different prices. The standard subscription model allows users to listen to an unlimited number of songs and to download them to a maximum of 3 computers, although they become unplayable as soon as the subscription ends. A more expensive subscription model also allows users to copy their songs into portable music players, but only if they have been given a license to the Napster DRM technology. In addition, every song may be recorded into a CD for extra 99cents. For more details, see <http://free.napster.com/>

¹⁹⁵ Apple iTunes Movie Rental Store has adopted an innovative business model in order to give users the possibility to rent movies online. More precisely, a movie may be rented for \$3.99 or \$2.99 according to how new the movie is, and users are subsequently given a period of 30 days to start watching the movie, although it gets automatically reduced to a period of 24 hours after the first time the movie has been played. For more details, see <http://www.apple.com/itunes/store/movies.html>

¹⁹⁶ Netflix is an online DVD rental store based on a subscription mechanism, according to which users can order a variable number of DVDs which are delivered directly in their mailbox. Netflix recently introduced a new service that is capable of delivering the movie directly to the user's computer by way of a particular DRM system allowing for the video to be streamed but not to be preserved on the computer. For more details, see <http://www.netflix.com/>

¹⁹⁷ Microsoft Windows Media DRM consists of a number of technological components designed to allow different types of devices to acquire and to display any content that has been technologically protected by Microsoft's DRM system. The Windows Media Rights Manager technology is licensed to content providers willing to encrypt their content in a Windows Media DRM format and to subsequently issue licenses with particular terms and conditions, whereas the Windows Media DRM technology is licensed to software companies willing to develop software applications capable of understanding the DRM format. For more details, see the Windows Media DRM FAQ at <http://www.microsoft.com/windows/windowsmedia/forpros/drm/faq.aspx>

LEGAL STATUS

Most of the commercial transactions involving digital content are generally associated with specific contractual agreements (sometimes described as End Users License Agreements or EULA) that precisely stipulate the terms and conditions under which the content can be exploited.¹⁹⁸

Despite their large scale deployment, the legal status of these licensing agreements remains, as such, ambiguous. Given that their provisions may be inconsistent with other bodies of law (e.g. contract law, consumer protection law, competition law, etc), it is uncertain whether these contractual agreements may actually qualify as valid and enforceable contracts.¹⁹⁹ Moreover, to the extent that they incorporate a particular set of provisions which have not been negotiated and are offered on a take-it-or-leave-it basis, most end-user licensing agreement are likely to qualify as a standard form contract,²⁰⁰ whose terms and conditions are usually not read carefully or at least not properly understood by end-users.²⁰¹ A number of complications could therefore come into play when trying to determine, on the one hand, the eligibility of a EULA as a valid contractual agreement, and, on the other hand, the extent to which the various terms and conditions incorporated into the licensing agreement could actually be enforced under contract law.

¹⁹⁸ End Users License Agreements (EULAs) contain the conditions governing the access to and the exploitation of digital products. While they give every licensee the possibility to carry out certain activities that would otherwise constitute copyright infringement, EULAs often implement a number of restrictions that may sometimes extend beyond the scope of the copyright regime. EULAs can therefore be extremely valuable in supporting the online distribution of content, however, they may sometimes cause some concerns with regard to the fairness of these transactions, as it is usually difficult to precisely draw the line between what is conscionable and what is unconscionable. For more details, see: TRAKMAN, L. E. (2007) Adhesion Contracts and the Twenty First Century Consumer. University of New South Wales.

¹⁹⁹ In particular, three issues can be identified with regard to the legal status of a EULA concerning the licensing of digital works: (1) whether the licensing agreement is valid as a matter of contract law; (2) whether the particular terms and provisions of the license are enforceable; and (3) whether certain provisions of copyright law can effectively be supersede by contractual means. LEMLEY, M. A. (1995) Intellectual property and Shrinkwrap Licenses. *Southern California Law Review*, 68.

²⁰⁰ A standard form contract can be defined as a pre-determined set of contractual provisions which are used by a firm on a regular basis in order to regulate the relationship with its customers. Standard form contracts are beneficial because they reduce transactions costs by eliminating the process of negotiation and by reducing the costs of obtaining information concerning the terms and conditions under which a product is licensed. See BURKE, J. J. A. (2000) Contract as Commodity: A Non-fiction Statutory Approach. *Statute Law Review*, 21. For an overview of the advantages of standard form contract from a law & economics perspective, see: KOROBIKIN, R. (2003) Bounded Rationality, Standard Form Contracts, and Unconscionability. *University of Chicago Law Review*. and SCHWARTZ, A. & SCOTT, R. E. (2007) Precontractual Liability and Preliminary Agreements. *Harvard Law Review*, 120.

²⁰¹ For a general overview of the characteristics of standard form contracts and the customary consumer behavior in the physical and in the digital environment, see HILLAMN, R. A. & RACHLINSKI, J. J. (2002) Standard-Form Contracting in the Electronic Age. *New York University Law Review*, 77.

In a large number of jurisdictions, the rules of offer and acceptance constitute the basic elements necessary for the formation of a valid contract.²⁰² While the element of the offer is generally apparent in the case of most end-user licensing agreements, the actual or presumed acceptance by end-users may be more difficult to establish. The main problem essentially resides in the determination of what constitutes consent. It may in fact be argued, on the one hand, that, as long as end-users do not actually consent to some of the terms and conditions of the license, these provisions may not be regarded as being part of the contractual agreement and will therefore not be enforceable under contract law. On the other hand, it may be argued that actual consent is not necessary as long as end-users have given an indirect manifestation of assent to the terms of the license by e.g. using the product.

Consequently, the enforceability of the terms and conditions of a licensing agreement ultimately depends upon the nature of the assent (whether it is actual or presumed) and on the scope thereof (whether it is general to the transaction or specific to the disputed provision).²⁰³ In the case of click-wrap, shrink-wrap and/or web-wrap licenses, the concept of assent can be distinguished between (1) actual assent, which amount to an express acceptance to the individual terms of the license, and (2) presumed assent, which merely amount to an express agreement to the transaction, from which it may be presumed that the licensee also consented to the terms and conditions of the license. However, in the case of presumed assent, it should not be assumed that the licensee has accepted each and every provision of the license, but only those which are directly related to the material terms of the transaction (i.e. the granting of a copyright license). Any additional provisions unrelated with the substance of the copyright license and merely intended to impose supplementary obligations and/or to restrict the rights of the licensees should therefore be regarded as having been assented to only upon actual acceptance by the licensee. Thus, while actual acceptance of every terms and conditions of the contractual license is likely to lead to the enforceability of the license as a whole (only subject to the specific limitations of contract law),²⁰⁴ in the case of presumed acceptance, the licensing agreement (albeit valid) may only be enforced to the extent that the individual provisions could have been reasonably expected by the licensee.²⁰⁵

²⁰² For a review of the fundamental requirements of contract formation, see ASHLEY, C. D. (1903) Mutual Assent in Contract. *California Law Review*, 3. and COHEN, M. R. (1933) The Basis of Contract. *Harvard Law Review*, 46.

²⁰³ For more details on the concept of acceptance in contract, with specific reference to the use of standard form contracts in the digital environment, see KIM, N. S. (2007) Clicking and Cringing. California Western School of Law.

²⁰⁴ As a valid contractual agreement, the provisions of a copyright license can generally be enforced under contract law by both the licensor and the licensee. However, in accordance with the principles of contract law (which may considerably differ from one jurisdiction to another), certain terms and conditions of the license may not be enforced whenever they have been improperly established (e.g. as a result of the incapacity of the parties, frustration, misrepresentation, mistake, duress or undue influence, unconscionability, bad faith, etc) or whenever the provisions of the licenses are incompatible with other bodies of law (e.g. copyright law, consumer protection law, competition law, etc).

²⁰⁵ According to the reasonable expectation doctrine (which emerged from the basic requirement in contract law that the terms and conditions of a contractual agreement be actually an expression of the meeting of minds of the various contracting parties), in order for the provisions of a standard form contract to be enforceable, they have be regarded as reasonable, in the sense that the average customer would not be surprised that these provisions to have been included into the contract. Conversely, unreasonable terms and conditions may not be enforced. See, e.g. WARE, S. J. (1989) A Critique of the Reasonable Expectations Doctrine. *University of Chicago Law Review*, 56. Consequently, although a contract is perfectly valid, its provisions may not necessarily all be enforced. See, in general: TREBILCOCK, M. J. (1993) *The Limits of Freedom of Contract*, Harvard University Press.

Moreover, it is sometimes alleged that EULAs actually constitute a contract of adhesion, the provisions of which are therefore less likely to be enforced.²⁰⁶

To date, the validity and the enforceability of a number of shrink-wrap, click-wrap and web-wrap licenses have been partly challenged in court, albeit with some discordant results.²⁰⁷

In the USA, for instance, they were initially regarded as unenforceable contracts, either because the license was regarded as a contract of adhesion²⁰⁸ or because the provisions of the license were considered to constitute additional terms and conditions independent from the original agreement.²⁰⁹ These licenses subsequently acquired a more significant legal status in the landmark case of *ProCD v Zeidenberg*,²¹⁰ where the court ultimately accepted the validity and the enforceability of shrink-wrap licenses. As an ordinary contract regulated by the common law of contracts and the Uniform Commercial Code, the license was held to constitute a valid

²⁰⁶ A contract of adhesion is a standard form contract offered on a take-it-or-leave-it basis and where the party who drafted the contract has more bargaining power than the other party. Although not invalid per se, a contract of adhesion is subject to special scrutiny and some provisions may not be enforced if they do not meet the reasonable expectation of the user or if they are regarded as being unconscionable in that they give an unfair advantage to one party. For a discussion with regard to the legitimacy of contracts of adhesion, see: KESSLER, F. (1943) Contracts of Adhesion: Some Thoughts about Freedom of Contract. *Columbia Law Review*, 43.

²⁰⁷ For a general overview of the different approaches that have been adopted by various jurisdictions around the world in order to address the concerns related to the legal status of shrink-wrap licenses, see XUE, J. (2009) A Comparative Study of Shrink-Wrap License. *Journal of Politics and Law*, 2.

²⁰⁸ See *Vault v. Quaid Software Limited* 847 F.2d 255 (5th Cir. 1988): Vault is a software company that distribute its product together with a shrink-wrap license prohibiting the reproduction, the modification, and the reverse engineering of the software. Quaid Software reverse engineered the software in order to develop an application capable of circumventing the copy protection mechanism, and Vault sued for breach of contract. The court held that, although State law allowed software producers to impose a number of contractual restrictions to the exploitation of computer software, the shrink-wrap license was unenforceable because (1) it was an unenforceable contract of adhesion and (2) the provisions of the license were preempted by federal copyright.

²⁰⁹ See *Step-Saver Data System Inc v. Wyse Technology and the Software Link Inc* 939 F.2d 91. (3rd Cir 1991): Step-Saver purchased a software developed by The Software Link and agreed over the phone that The Software Link would ship the software together with an invoice stipulating the formerly contracted terms and conditions with regard to price, quantity and method of payment. The software was however shipped with an additional shrink-wrap license that disclaimed any form of express and/or implied warranties and Step-Saver sued for breach of warranty. The court relied on section 2-207 of the Uniform Commercial Code and concluded that in the absence of assent to the additional terms, only the original contractual agreement was enforceable. See also *Arizon Retail Systems Inc v. The Software Link Inc* 831 F. Supp. 759 (D. Ariz. 1993).

²¹⁰ See *ProCDInc v. Zeidenberg*, 86 F.3d 1447, 1449 (7th Cir. 1996): Matthew Zeidenberg acquired a copy of the Select Phone database of ProCD. The manner in which the database could be used was regulated by a license that prevented the purchased copy of the database from being used for any commercial purpose, in order to allow for price discrimination by charging different prices for the non-commercial and the commercial version of the database. The license was expressed in the form of a shrink-wrap license but also in the form of a click-wrap license which had to be accepted before installing the software and which appeared on the screen every time the database was used. As Zeidenberg created his own database based on the data of the Select Phone database and offered the data on the Internet for a small fee in spite of the prohibition to do so, ProCD sued for breach of the contractual provisions against commercial usage stipulated by the EULA. The District Court held that the terms of the EULA were not enforceable because (1) the license was not a valid contract and (2) even if it were, the terms would be preempted by federal copyright law. The Court of Appeals for the 7th Circuit reversed the decision holding (1) the license should be treated as an ordinary contract and (2) the terms should be enforced, unless they are proven to be objectionable on the grounds of a particular body of law.

contractual agreement, since it was necessary for the users to take positive action in order to manifest their assent with the terms of the agreement, which should therefore be enforced as long as they do not conflict with any relevant body of law.²¹¹ Yet, whether or not the license can be regarded as an enforceable contract ultimately depends upon the issue of consent. Accordingly, in *Klocek v Gateway*,²¹² the EULA was held not to be legally enforceable because the provisions of the license were considered to be additional terms upon which the parties had not previously agreed.²¹³ Similarly, in *Specht v Netscape Communications*,²¹⁴ it was held that the terms and conditions of the EULA could not be enforced, since the provisions of the license may only become effective upon mutual assent of the parties.

In Europe, given the level of inconsistencies between the national legislations, the legal status of many EULAs has always been rather unclear.²¹⁵ For instance, in the Netherlands, it was held that a shrink-wrap license does not constitute an agreement between the parties if one party was not aware of the conditions of the license

²¹¹ See section 2-204(1) of the US Uniform Commercial Code: "A contract for sale of goods may be made in any manner sufficient to show agreement, including conduct by both parties which recognizes the existence of such a contract." Accordingly, a vendor may invite acceptance by conduct and a buyer may accept the offer by performing the acts the vendor proposes to treat as acceptance. In the case of ProCD, who proposed a contract that a buyer could accept by using the software after having an opportunity to read the license, Zeidenberg accepted that contract by using the database and was consequently bound to its terms. *ProCDInc v. Zeidenberg*, 86 F.3d 1447, 1449 (7th Cir. 1996)

²¹² See *William S. Klocek v. Gateway et al.* 104 F.Supp.2d 1332 (D. Kan. 2000): Klocek acquired a computer from Gateway, which distributes computers together with a shrink-wrap license according to the user is deemed to have accepted the terms and conditions of the license if the computer has not been returned within 5 days after the date of delivery. Klocek brought proceedings against Gateway, claiming that it induces consumers to purchase computers by making false promises of technical support. The question related to whether additional terms received together with a purchased product may constitute part of the purchasing agreement. The court held that the provisions of the shrink-wrap license cannot be enforced against a user who has not manifested assent to the particular terms and conditions.

²¹³ See section 2-207 of US Uniform Commercial Code, according to which additional terms may not constitute part of an original agreement unless the offer stipulates the assent to these terms as a condition for acceptance. Otherwise, if the additional terms are not specifically assented to, the user shall be deemed to have accepted only the offer of the original agreement which does not include the additional terms. In the case of *Klocek v Gateway*, William S. Klocek was therefore held not to be subject to the terms and conditions of the shrink-wrap license, because the conditional nature of the acceptance was not expressed clearly enough so as to notify the user that Gateway was unwilling to proceed with the transaction unless the additional terms were included into the contract. *William S. Klocek v. Gateway et al.* 104 F.Supp.2d 1332 (D. Kan. 2000)

²¹⁴ See *Specht v. Netscape Communications Corp.*, 150 F. Supp. 2d 585 (S.D.N.Y.2001): Netscape Communications offers software for users to access the Internet, such as the Smart Download software used to download files from the Internet. The software can be obtained from the Netscape's website by merely clicking on the download button. Reference to the EULA is only made by way of a link pointing to another webpage where the full text of the license is displayed and which state that by using the software the user accepts to be bound to the terms and conditions of the license. The EULA was held not to be enforceable because (1) it was possible to download the software without assenting to the terms and conditions (2) the link only referred to the existence of a license but did not specify that every user using the software would be deemed to have agreed with the terms (3) the text of the license was not directly visible on the download page.

²¹⁵ For an overview of European case law with regard to the validity and/or the enforceability of various types of end-user license agreements, see COTEANU, C. (2005) *Cyber Consumer Law and Unfair Trading Practices: Unfair Commercial Practices (Markets and the Law)*, Ashgate Publishing.

before purchasing the product.²¹⁶ In the UK, it was held that EULAs may not be enforced on subsequent purchasers because the doctrine of privity in contract law would not allow for them to be bound by any third party agreement.²¹⁷ In Scotland, instead, the validity of the license was justified on the basis on the doctrine of *jus quaesitum tertio*, according to which the contracting parties are entitled to confer particular rights to a third party.²¹⁸

A series of international instrument have been introduced as an attempt to reduce the level of uncertainty concerning the validity and the enforceability of different end-user licensing agreements amongst different jurisdictions.

At the European level, in particular, the Directive 1993/13/EEC on Unfair Contract Terms provides a series of legal remedies to anyone who has become part to a contract without the opportunity of becoming acquainted to its terms.²¹⁹ As a result of this Directive, different countries introduced specific provisions regulating the enforceability of standard form contracts within their national legislation. For instance, the UK implemented the European Directive through the enactment of the Unfair Terms in Consumer Contracts Regulations, which requires the Office of Fair Trading to investigate any complaint related to unfair terms and to come up with appropriate amendments to every unreasonable contractual term.²²⁰ In Germany, instead, the civil Code was amended with the Standard Terms Statute which provides a definition of unfair contract terms as well as a series of legal remedies against any contractual term that would place the consumer at an unreasonable disadvantage.²²¹

In the USA, instead, the National Conference of Commissioners on Uniform State Law (NCCUSL) has been working on the development of the Uniform Computer Information Transactions Act (UCITA) with the intention to establish the necessary rules to ensure a uniform enforceability of shrink-wrap, click-wrap and

²¹⁶ See *Coss Holland B.V. v. TM Data Nederland B.V.* (May 24, 1995) Amsterdam, Court of first instance.

²¹⁷ See *St Albans City & District Council v International Computers Ltd*, High Court, Scott Baker J., 3rd October 1994

²¹⁸ See *Beta computers (Europe) Ltd v Adobe Systems (Europe) Ltd* [1996] FSR 367

²¹⁹ See the European Directive 1993/13/EEC on Unfair Contract Terms, according to which a term should be regarded as not negotiated whenever “it has been drafted in advance and the consumer has therefore not been able to influence the substance of the term, particularly in the context of a pre-formulated standard contract”.

²²⁰ In 1999, in the United Kingdom, the Office of Fair Trading issued the Unfair Terms in Consumer Contracts Regulations, according to which the Director General of Fair Trading is under the obligation to investigate complaints related to unfair terms. The Office of Fair Trading has also been extensively involved in providing advice and support to the relevant actors in the industry in order to help them devise standard contract terms that are compatible with the provisions of the Directive.

²²¹ In 2002, the German Standard Terms Statute has been incorporated into the German civil Code. See, in particular, section 305(c)(1) of the Code, which expressly stipulates that surprising and/or unreasonable contractual terms shall not become part of the contract. According to the German Standard Terms Statute, the enforcement of any standard contract term should be subject to (a) the accessibility test, to check whether or not it qualifies as a prohibited term, and (b) the reasonability test, to assess whether it should nevertheless be regarded as an invalid term to the extent that it does not fulfill the requirements of good faith.

web-wrap licenses.²²² The Act has however been subject to strong criticism²²³ and the legislation has thus far only been passed in two States (Virginia and Maryland).

At a more international level, the International Institute for the Unification of Private Law (UNIDROIT) has established a set of common principles for the regulation of commercial contracts on an international scale.²²⁴ Although it does not specifically deal with shrink-wrap, click-wrap or web-wrap licenses, a number of provisions concerning standard form contracts and the conditions under which their respective terms and conditions can be legally enforced may nevertheless be applicable to a variety of end-user licensing agreements.

SECTION 3

BENEFITS

Many right holders may be unwilling to make their works available on the Internet unless they can ensure that the terms and conditions of the relevant copyright license will be ultimately complied with. While the enforceability of certain end-user licensing agreements may be difficult to determine, the possibility of using technological means in order to automatically enforce the provisions thereof may encourage content providers to experiment with new business models.

The drawback is that many content providers are likely to distribute their works in combination with specific technological measures of protection that preclude their works from being exploited in any other way than

²²² The UCITA has been conceived with the intention to facilitate the transactions of information goods in the digital environment and to clarify the law governing these transactions so that it can be applied uniformly amongst the various jurisdictions. The scope of the Act extend to any kind of computer information transaction, including commercial agreements to create, modify, transfer or distribute computer software, multimedia interactive products, computer data and databases, and Internet and online information. The goal is to provide a firm basis for marketplace transactions in cyberspace, by establishing a legal basis that explicitly recognizes the importance of the unique modes of contracting and doing business in the information society. See the Uniform Computer Information Transactions Act, Prefatory Notes.

²²³ UCITA allows most of the terms incorporated into a licensing agreement to be enforced, a situation which would undermine the traditional doctrines of intellectual property that have been conceived to protect the rights of users. See KANER, C. (2002) UCITA: a disaster in progress. *Spectrum*, 39. In fact, while it may validate shrink-wrap, click-wrap and other mass-market licenses of information, it would also have a considerable impact on the rules governing electronic transactions in information goods, allowing content providers to eliminate the first sale doctrine and other limitations of the copyright regime by way of restrictive licensing agreements and self-help mechanisms of technical enforcement. See SAMUELSON, P. (1998) Legally Speaking: Does Information Really Want to be Licensed? *Communications of the ACM*.

²²⁴ See the Principles of International Commercial Contracts established in 1994 by the UNIDROIT. In particular, section 2.19 defines standard form contracts as “provisions which are prepared in advance for general and repeated use by one party and which are actually used without negotiation with the other party” and section 2.20 provides that a standard form contract is not enforceable whenever it contains a term “which is of such a character that the other party could not reasonably have expected it is effective unless it has been expressly accepted by that party.”

what is explicitly endorsed by the licensing agreement.²²⁵ It thus becomes possible for right holders to rely upon the operation of DRM systems in order to protect their works not only against copyright infringement but also against the violation of certain contractual provisions.

This drawback is, nonetheless, counterbalanced by an important advantage. Releasing a work under a variety of licenses whose contractual provisions can be enforced by technological measures allows for a very sophisticated form of price discrimination to be implemented. Specific versioning strategies can be developed in order to satisfy the needs of different consumers with different willingness to pay. Restrictive licensing practices combined with DRM systems make it possible for content providers to offer the same work at a different price, discriminating amongst consumers according to their different willingness to pay and their particular expectations with regard to both the quality and the manner in which the work can be exploited. Likewise, an identical work may be released in different formats and/or quality according to the willingness to pay and specific needs of consumers.²²⁶ As a result, while it can be very advantageous to right holders, whose profits are likely to increase, price discrimination may also benefit society at large, whose overall welfare is likely to rise as a result of the reduced deadweight loss generated by the copyright regime.²²⁷

In spite of the large variety of rights and obligations that might regulate the exploitation of different digital works, thanks to the employment of DRM systems, no additional costs would have to be incurred in order to determine the legal status of a work and to identify the owners of the various interests vesting in that works.²²⁸

²²⁵ While right holders can always enforce their rights with traditional legal means (i.e. copyright law and contract law), the digital environment has made enforcement by way of technological restrictions an ever more appealing alternative. Although the legitimacy of these restrictions is to some extent controversial (see *infra* Part 2. Chapter 3: Private Regulation: Digital Rights Management Systems. Subsection 3: Problems), DRM systems are in fact an effective mechanism to complement the contractual provisions of a licensing agreement by constraining the usage of a work in any way that is technically feasible. For a functional description and technological analysis of DRM systems, see BARLAS, C., CUNARD, J. & HILL, K. (2003) Current Developments in the Field of Digital Rights Management. WIPO Standing Committee on Copyright and Related Rights.

²²⁶ Extensive price discrimination would allow for consumers to pay for the right to exploit a work in any way they see fit, without being required to pay for any additional right they would never make use of. For an overview of the various modalities of product customization and price discrimination for the sale of information goods, see: VARIAN, H. R., FARRELL, J. & SHAPIRO, C. (2004) *The Economics of Information Technology: An Introduction*, Cambridge University Press. For more information on how DRM systems may assist in the price discrimination of digital works, see BOMSEL, O. & GEFFROY, A.-G. (2005) Economic Analysis of Digital Rights Management systems. Paris, CERNA.

²²⁷ Whenever a product is sold at a price that is higher than the marginal cost of production, there will be a welfare loss on society because consumers whose willingness to pay is higher than the marginal cost but lower than the actual price will be excluded from consumption. With regard to works in the digital environment, although their marginal cost of production is zero, the price needs necessarily be higher because it would otherwise be impossible for the author to recoup the fixed costs of creation. Price discrimination enables the author to extract the maximum profit from the different willingness to pay of consumers, while simultaneously reducing the deadweight loss generated by the copyright regime by making the work available to a higher number of people. For more details concerning the price discrimination of information goods, see VARIAN, H. R. (1995) Pricing Information Goods. *Scholarship in the New Information Environment*. Harvard Law School.

²²⁸ Clearing all the necessary copyright rights may sometimes be a very complex and expensive task, in particular in the case of works that are made up of many other works released under different terms and conditions and pertaining to different right holders. By endorsing specific standards for the recording of copyright related information into every digital work, DRM systems together with their respective Right Expression Languages constitute an effective tool to identify the legal status of a work and the owners of

Most importantly, DRM systems may considerably reduce the transaction costs which traditionally had to be incurred in order to negotiate and to obtain a license for any given exploitation of the work. It may therefore be argued that the main economic justification for the introduction of a series of copyright limitations - based on the idea that a number of socially valuable transactions may not be completed as a result of the market failure resulting from excessive transaction costs - will progressively go disappearing as DRM systems become more and more sophisticated and ubiquitously deployed.²²⁹ A scheme of micro-payments may instead progressively emerge, where perfect price discrimination could eventually be achieved by charging users on a per use basis.²³⁰

Finally, DRM technologies may be integrated together with new distribution mechanisms in order to develop innovative business models where users pay to acquire temporary access to a work (e.g. subscription mechanisms where users pay for the general access to a particular collection of works, pay-per-use and on-demand services where users pay every time they access a particular work, demos and previews where users only pay if they are interested in accessing the content in full) without acquiring the ownership of the work

different interests in the work. See FERNANDEZ, I. G. & MERCE, J. D. (2005) XML and Digital Rights Management over the Internet. *The European Journal for the Informatics Professional*, 6.

²²⁹ Copyright limitations may be regarded as an answer to a specific form of market failure resulting a situation where the costs of transaction that have to be incurred in stipulating a contract between the right holder and the users are higher than the value that can be derived from the transaction. In such circumstances, certain limitations of the copyright regime allowing for a work to be exploited without the consent of the copyright owner may be justified on the grounds that no transaction would have otherwise occurred. Allowing for the unauthorized exploitation of the work would therefore enable a socially valuable use to be performed without impairing the potential revenues copyright owner. See, in general, GORDON, W. J. & BONE, R. G. (2000) Copyright. IN BOUCKAERT, B. & GEEST, G. D. (Eds.) *Encyclopedia of Law and Economics*. Cheltenham, Edward Elgar. For a broader and more detailed analysis on the economic justification for the introduction of a series of copyright limitations based on the concept of market failure, see LANDES, W. M. & POSNER, R. A. (2003) *The Economic Structure of Intellectual Property Law*, Cambridge, Massachusetts, The Belknap Press of Harvard University Press. See, however, also the various critics to this strictly economical interpretation of copyright exemptions in e.g. BENKLER, Y. (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press.

²³⁰ In such a scheme, users would only pay for what they consume. They would not acquire any rights in a work, but merely the possibility to access or exploit one basic element of the work (e.g. to display one page of a book, to listen one time to a song, etc). The advantage of a micropayment scheme is that consumers who are not willing to pay the full price to obtain full access to a work will be given the possibility to purchase a single access to a single element of the work for a much lower fee. Assuming that the more they use a work, the higher is the users' willingness to pay for that work, the establishment of a system of micropayments may to some extent be regarded as a strategy to achieve maximum price discrimination. For more details on DRM systems and the mechanism of micropayments, see LIEBOWITZ, S. (2002) Policing Pirates in the Networked Age. *Policy Analysis*, 438.

itself.²³¹ In spite of the limitations on access and usage, the advantages for end-users are the lower prices associated to these services and the possibility to access the work from anywhere and at any time.²³²

Another important advantage of DRM systems is that they make it possible for right holders to monitor every usage that is being made of a work and to collect relevant information on every user's identity and activities.²³³ Provided that it does not impinge upon the privacy of the individuals concerned, right holders can subsequently process the data they have gathered in order to gain deeper insight over the behavior of different categories of users and to acquire valuable information about the popularity of their works.²³⁴

Accordingly, the combination of end-user licensing agreements and technological measures of protection are likely to result into the emergence of new business models based upon extensive price discrimination, which are likely provide a series of benefits to right holders, but which are also likely to benefit consumers insofar as they can pay only for the content they want with the opportunity to access it from the place and at the time individually chosen by them.

²³¹ Internet and the digital technologies have endorsed the emergence of a variety of business models for the distribution of digital content on the digital environment. Subscription-based access to a large number of works or the institution of metered services would in fact be impractical in the physical environment. DRM systems provide the necessary infrastructure for these new business models to be implemented and make them economically viable by technologically enforcing the terms and the conditions under which every work can be exploited. See SANDER, T. (2001) *Golden Times for Digital Rights Management?*, InterTrust Technologies.

²³² With the advent of ever more sophisticated forms of DRM systems, users have acquired an ever higher level of discretion with regard to the time and the manner in which they may access and/or exploit digital content. In addition, while network convergence and the deployment of a global infrastructure of communication have given users the possibility to access content from any place and at any time, media convergence is allowing content to be displayed on an increasing number of devices. For an overview on the emerging mechanisms of content distribution in the digital environment and the need for a centralized management system, see WOLF, M. & WHEELLOCK, C. (2007) *Digital content unleashed. Journal of Digital Asset Management*, 3.

²³³ While the main purpose of a DRM system is to protect and/or to manage the exploitation of a digital work, they may sometimes feature certain monitoring mechanisms in order to keep track of every usage that is made of the work. For instance, right holders can keep track of the time, the date and the manner in which the work has been exploited, together with the identity of the user who has performed the action (whenever that information has been made available). Although not a necessary feature, the ability of a DRM system to track usages is one important attribute for right holders to be more aware of the manner in which their works are being exploited. See e.g. BARTOLINI, F., CAPPELLINI, V., PIVA, A., FRINGUELLI, A. & BARNI, M. (1999) *Electronic Copyright Management Systems: Requirements, Players and Technologies. 10th International Workshop on Database & Expert Systems Applications*. IEEE.

²³⁴ The privacy of the end-user is being threatened by the advent of technological measures designed to control individuals' behaviors and to collect information about their intellectual preferences and activities. See e.g. COHEN, J. E. (2003) *DRM and Privacy. Berkeley Technology Law Journal*, 18. DRM systems, however, are not as such incompatible with privacy laws, provided they have been designed so as to respect the right to privacy of every user. See e.g. KORBA, L. & KENNY, S. (2002) *Towards Meeting the Privacy Challenge: Adapting DRM*. Canada, Institute for Information Technology, National Research Council.

PROBLEMS

The advantages discussed above can only be achieved to the extent that no one is likely to circumvent the technological measures which constitute the basic infrastructure of these DRM systems. While this cannot be prevented by virtue of technology alone, from a legislative standpoint, the problem has been addressed with the introduction of an additional layer of protection against the circumvention of certain technological measures of protection.²³⁵ However, a series of complications have emerged as a collateral effect arising from the ability for right holders to license their works under restrictive terms and conditions that can be automatically enforced by technological means, even if they run counter to the general principles of copyright law and/or violate the provisions of other bodies of law.

A. CONSUMER RIGHTS

In a context where every act of consumption is ultimately governed by technological measures of protection, releasing a work under a restrictive end-user licensing agreement may seriously affect the ability for end-users to legitimately exercise their rights. Even though certain provisions may not be enforceable under contract law because they are inconsistent with other bodies of law, they may, nevertheless, be enforced by technological means - the circumvention of which is punished under copyright law.²³⁶

To the extent that users are precluded from performing an act before it is even possible to address the legitimacy of that act, the regime of copyright exemptions can no longer be used as a defense to copyright infringement.²³⁷ In addition, the number of exemptions available to users of technologically protected works

²³⁵ See the WIPO Copyright Treaty of 1996, article 11: "Contracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with the exercise of their rights under this Treaty or the Berne Convention and that restrict acts, in respect of their works, which are not authorized by the authors concerned or permitted by law." and article 12(1): "Contracting Parties shall provide adequate and effective legal remedies against any person knowingly performing any of the following acts knowing [...] that it will induce, enable, facilitate or conceal an infringement of any right covered by this Treaty or the Berne Convention: (i) to remove or alter any electronic rights management information without authority; (ii) to distribute, import for distribution, broadcast or communicate to the public, without authority, works or copies of works knowing that electronic rights management information has been removed or altered without authority" as well as the corresponding provisions in the WIPO Performances and Phonograms Treaty of 1996, at articles 18 and 19 respectively.

²³⁶ Although there are certain limited situations in which technological measures employed for the protection of copyright work can be circumvented (see e.g. section 1201 subsections (d) (e) (f) (g) (h) (i) (j) of Digital Millennium Copyright Act of 1998 in the USA, and article 6(4) of the Copyright Directive 2001/29/EC in Europe), as a general rule, however, both the circumvention of technological measures for protection of copyright works and the manufacture or the dissemination of devices principally designed to enable the circumvention thereof constitute a violation of copyright law (see articles 11 and 12 of the WIPO Copyright Treaty). For a broader overview, see: *supra* Part I. Chapter 3: Private Regulation: Technological measures. Section 2: Legal status.

²³⁷ If users are precluded ex-ante from performing an act, they will not have the chance to experiment with the new technology, for courts to subsequently decide whether that particular activity constitutes copyright infringement, whether it may fall within the

has been drastically reduced. In Europe, for instance, the regime of exemptions only applies into the digital environment in the absence of any voluntary measure taken by right holders.²³⁸ In the USA, instead, the DMCA introduced a specific set of exemptions allowing for the circumvention of technological measures only in a very limited set of circumstances, which is much narrower than the traditional principles of fair use.²³⁹

Technological measures of protection are also generally not able to understand the idea/expression dichotomy, nor can they distinguish between the protected elements of a work and the elements which are a constitutive part of the public domain.²⁴⁰

B. PRIVACY

In the digital environment, the interrelation between copyright law and privacy law has become problematic because the measures taken for the enforcement of the former do not necessarily comply with the constraints of the latter. While DRM systems can be extremely valuable tools in the protection of the economic interests of right holders, they are likely to impinge upon the privacy of end-users. Indeed, given that they can keep a record of every usage that has been made of a work without asking for the user's consent,²⁴¹ the resulting data

current scheme of copyright exemptions, or, alternatively, whether the principles of fair dealing may need to be revised to better accommodate the new technology. LOHMANN, F. V. (2002) Fair Use and Digital Rights Management: Preliminary Thoughts on the (Irreconcilable?) Tension between them. *Computers, Freedom & Privacy*.

²³⁸ See article 6(4) of the European Directive 2001/29/EC (paragraph 1): Member States are entitled to intervene only "in the absence of voluntary measures taken by right holders, including agreements between right holders and other parties concerned" (paragraph 4): "The provisions of the first and second subparagraphs shall not apply to works or other subject-matter made available to the public on agreed contractual terms in such a way that members of the public may access them from a place and at a time individually chosen by them."

²³⁹ In the United States, the Digital Millennium Copyright Act of 1998(DMCA), section 1201 prohibits the circumvention of technological measures of protection regardless of the purpose for which circumvention is made. The Act nevertheless stipulate a number exemptions (see section 1201 subsections d: Exemption for Nonprofit Libraries, Archives, and Educational Institutions; e: Law Enforcement, Intelligence, and Other Government Activities; f: Reverse Engineering; g: Encryption Research; h: Exceptions Regarding Minors; i: Protection of Personally Identifying Information; j: Security Testing)which establishes a particular regime of limitations for technologically protected copyright works that is much less flexible than the system resulting from the application of the fair use doctrine of the US Copyright Act of 1976, 17 U.S.C. § 107

²⁴⁰ Not every aspect of a work is protected by the copyright regime. In particular, facts and ideas are not eligible for copyright protection, as opposed to the expression thereof, and neither are the elements that have been taken from the public domain. As such, DRM systems are not able to determine which elements of a work are subject to copyright protection, although they may be able to do so with specific metadata that identifies the legal status of every element of the works. See MULLIGAN, D. & BURSTEIN, A. (2002) Implementing Copyright Limitations in Rights Expression Languages. *ACM Workshop on Digital Rights Management*. However, while this may be a viable solution for DRM systems not to unnecessarily restrain the exploitation of the public domain elements of a work, it would however entail considerable costs and the complexity involved may not always be compensated by the resulting benefits.

²⁴¹ See e.g. Sony BMG's CDs, which secretly infected users' computers with a software application that collected information on the activities of users and reported it to Sony BMG without appropriate notice and consent. Although it did not collect any personal information but only data concerning the songs played and the IP addresses of users, the real identity of users could actually be

could be used, not only for the purpose of protecting the copyright in a work, but also for other purposes which the user may not necessarily endorse.²⁴²

There exists, therefore, a conflict between the legal protection granted to the owners of the copyright in a work and the protection of the fundamental right to privacy that pertains to every individual user.²⁴³ Although both the Copyright Directive in Europe and the DMCA in the USA have expressly addressed the need for DRM systems to protect the interests of right holders while simultaneously preserving the users' right to privacy,²⁴⁴ no mechanism has thus far been established in order to reconcile the interests of the two parties. Moreover, while the DMCA introduced specific provisions allowing for the circumvention of technological measures of protection for the purpose of preventing the collection and the dissemination personal data,²⁴⁵ no

tracked back from their IP address by their Internet Service Providers. For more details, see FELTEN, E. W. & HALDERMAN, J. A. (2006) Digital Rights Management, Spyware, and Security. *Security & Privacy*, 4.

²⁴² Data protection laws are intended to protect the fundamental right of privacy and must therefore regulate the design and the operation of DRM systems with regard to the collection, the storage, the processing and/or the dissemination of data. While the monitoring of user's activities in order to prevent copyright infringement may be regarded as a legitimate reduction of users' privacy necessary to protect the copyright right in a work, the processing and/or dissemination of the data for secondary purposes may be more problematic. To date, however, the implementation of most DRM technologies has paid only little attention to privacy concerns. For more details on how DRM systems are likely to impinge upon the privacy of users, see BYGRAVE, L. A. & KOELMAN, K. J. (2000) Privacy, Data Protection and Copyright: their interaction in the context of electronic copyright management systems. IN HUGENHOLTZ, B. P. (Ed.) *Copyright and Electronic Commerce*. Kluwer Law International.

²⁴³ See article 12 of the Universal Declaration of Human Rights: "No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honor and reputation. Everyone has the right to the protection of the law against such interference or attacks." See, also the European Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data, regulating the processing of personal data (by automated or non-automated means) which shall be processed only for legitimate purposes and according to the principles of transparency and proportionality; and the various sectorial regulations in the US (such as *inter alia*, the Video Protection Act of 1988, the Cable Television Consumer Protection and Competition Act of 1992, and the Fair Credit Reporting Act).

²⁴⁴ See article 9 of the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society, according to which the Directive "shall be without prejudice to provisions concerning in particular [...] data protection and privacy" and more particularly recital 57, according to which "rights-management information systems [...] should incorporate privacy safeguards in accordance with Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and the free movement of such data." See section 1201(i) of the Digital Copyright Millennium Act, introducing a particular exemption which allows for the circumvention of technological measures for the purpose of preventing the collection and dissemination of personally identifying information.

²⁴⁵ See section 1201(i) of the Digital Copyright Millennium Act, according to which it is not a violation for a person to circumvent a technological measure that effectively controls access to a work if (a) it is capable of collecting or disseminating personally identifying information reflecting the online activities of a natural person who seeks to gain access to the work protected; (b) without providing conspicuous notice to such person and without providing any possibility to prevent or restrict such collection or dissemination; (c) the act of circumvention has the sole effect of identifying and disabling the capability described in subparagraph (a) and has no other effect on the ability of any person to gain access to any work; (d) the act of circumvention is carried out solely for the purpose of preventing the collection or dissemination of personally identifying information and is not in violation of any other law.

similar exemption has been introduced in Europe.²⁴⁶ Accordingly, identifying the circumstances under which the protection of the copyright in a work may actually prevail over the protection of the fundamental right to privacy is a very difficult issue which has yet to be resolved.²⁴⁷

C. INFERIOR PRODUCTS

The need to protect the interests of right holders may sometimes be satisfied at the expense of the interests of consumers. For the purposes of price discrimination, users are likely to be offered products whose key features have been intentionally disabled by technological means and which are therefore less functional than their non-protected counterparts.²⁴⁸ In addition, even if they are only meant to discourage copyright infringement, certain technological measures may also be detrimental to the security or to the integrity of the device they have been stored into.²⁴⁹ Finally, content encoded into a proprietary format is likely to be less attractive to users. Not only can it only be accessed or consumed on authorized devices, but it also might eventually become insignificant since there is no guarantee that the technology will not be discontinued and become forever obsolete.²⁵⁰

²⁴⁶ As a result, if the legal protection granted to technological measures of protection also applies to technological devices aimed at monitoring the usage of a work, the circumvention of any such mechanism may be regarded as an infringement of copyright law even if it would be perfectly justifiable according to the data protection laws. See BYGRAVE, L. A. (2002) *The Technologization of Copyright: Implications for Privacy and Related Interests*. *European Intellectual Property Review*, 24.

²⁴⁷ See e.g. the case of *Promusicae v Telefonica* (2008) ECJ C-275/06, where Promusicae (an organization of music producers) sought an order from the Spanish Commercial Court for the ISP Telefonica to disclose the identity and the address of some users whose IP addresses had been collected by Promusicae on Kazaa. The question of whether there was a duty for an ISP to retain and make available the personal data of its subscriber for the purpose of bringing civil proceedings was referred to the ECJ, which held that EU law does not require member states from implementing such a constraints, but does not either prohibit them from doing so. The ECJ thus tried to balance the protection of Intellectual Property and the right to privacy without expressing a particular preference with regard to which right should prevail over the other.

²⁴⁸ For instance, CDs with certain copy-protection mechanisms may not be properly played on every CD player, because specific errors which have been deliberately introduced into the CD in order to prevent it from being played on a personal computer may negatively affect, or even preclude their readability in a variety of hardware and software devices. In addition, the errors are likely to degrade the sound quality and shorten the lifetime of the CDs they have been introduced into. For more details, see HALDERMAN, J. A. (2002) *Evaluating New Copy-Prevention Techniques for Audio CDs*. *ACM Workshop on Digital Rights Management*. Washington DC.

²⁴⁹ See e.g. Sony BMG's CDs, which secretly installed a software application (XCP) into the users' computers in order to prevent the unauthorized reproduction of the content of the CD. The software had however a series of security flaws, which could be exploited by malicious software in order to gain administrative control over the users' computers. For more details, see CASS, S. (2006) *Antipiracy software opens door to electronic intruders*. *Spectrum*, 43.

²⁵⁰ As new technologies develop, previous technologies may become obsolete and a large amount of data may become inaccessible as the hardware and software devices that rely on these technologies progressively disappear and new devices are developed which may no longer support backwards compatibility. Sometimes, the firm providing a particular technology may itself disappear. Accordingly, digital content which has been incorporated into a proprietary technological measure of protection runs the risk of

This problem is closely related to the issue of interoperability. Although it is theoretically possible to translate digital content from one format to another, several reasons may prevent users from converting a technologically protected work into another format. To begin with, for the purposes of copyright law, conversion would amount to an unauthorized reproduction of the work which is likely to be infringing unless it qualifies under the regime of copyright exemptions. Moreover, to the extent that it requires the circumvention of technological measures of protection, conversion might be regarded as a further infringement unless it has been expressly exempted by the law.²⁵¹ With reference to contract law, instead, converting the content into another format may be precluded by a series of contractual provisions, the violation of which would constitute a breach of the licensing agreement.²⁵² Finally, at the technological level, the format from which or into which the content is to be converted may be a proprietary format whose encryption or decryption algorithm has not been disclosed to the public.²⁵³ The use of excessively restrictive or faulty DRM systems and the lack of interoperability amongst them are therefore likely to result in an inferior product which does not properly satisfy the expectations of consumers.

D. ANTI-COMPETITIVE PRACTICES

The use of proprietary systems and the refusal to license the technology necessary for the making of interoperable devices could, under certain circumstances, be regarded as an anti-competitive practice aimed at

being forever trapped in an obsolete format or medium, unless it can be converted into a new technological format. See KUNY, T. (1997) A Digital Dark Ages? Challenges in the Preservation of Electronic Information. *International Preservation News*, 17.

²⁵¹ For instance, in the USA, the DMCA allows users to circumvent a technological measure for the purpose of enabling interoperability of an independently created computer program with other programs, to the extent that doing so does not constitute copyright infringement (see section 1201(f) of the DMCA), although this only applies to computer programs and not to works generally such as music or audiovisual works (see the Senate Committee Report on the DMCA 105-190). In Europe, the Software Directive include a series of provisions with regard to the interoperability of computer programs (see article 6 of the European Directive 91/250/EC), the Copyright Directive does not comprise any such provisions, although it appears to encourage Member States to adopt certain interoperability measures (see recital 54 of the European Directive 29/2001/EC). Only a few Member States have in fact incorporated specific interoperability provisions in their national legislation (see e.g. the HADOPI law in France).

²⁵² The iTunes Music Store's EULA expressly states that users are allowed to export the purchased music files into another format as long as this is done for personal purposes. However, iTunes software will refuse to convert any DRM protected file into another format, and the EULA prevents users from attempting to circumvent or to modify any security technology. See iTunes' Terms of Services at <http://www.apple.com/legal/itunes/us/service.html>. Moreover, conversion has been expressly prohibited by a large number of more restrictive EULAs, see e.g. the terms and conditions regulating the exploitation of the digital content that can be downloaded on Napster (<http://www.napster.com>); PassAlong Music Store (<http://www.passalong.com>); PayPlay.FM Music Downloads (<http://payplay.fm>), CinemaNow (<http://www.cinemanow.com>), VidZone (<http://www.vidzone.tv>), MovieLink (<http://movielink.com>), etc.

²⁵³ See e.g. the CSS technology employed to protect the content of most commercial DVDs against unauthorized reproduction. As the CSS technology is itself protected by Intellectual Property rights, it is not available for anyone to incorporate it into a hardware or software device, but only gets licensed to certain device manufacturers who agree to abide to the specific terms and conditions of the licensing agreement and who can afford to pay the corresponding fees.

reducing competition in the market.²⁵⁴ Not only can large technology providers rely upon the anti-circumvention regime in order to foreclose competition in the market of playback devices,²⁵⁵ but they might also engage into leveraging practices in order to exploit the market power that they have acquired in one market into a complementary market - such as e.g. the market of content distribution.²⁵⁶

In many cases, the lack of interoperability between DRM systems is also likely to create a situation of consumer lock-in, where users can no longer depart from one technology without incurring significant loss.²⁵⁷ As a general rule, technologically protected content can only be accessed on a specific set of hardware or software

²⁵⁴ See e.g. the Judgment No. 04D54 of the French Conseil de la Concurrence (2004) which addressed a complaint issued by VirginMega to the French competition authority against Apple, on the ground that Apple's refusal to license the FairPlay DRM technology was an abuse of dominant position according to article 82 of the EC treaty. For a general overview of the case, see MAZZIOTTI, G. (2005) Did Apple's refusal to license proprietary information enabling interoperability with its iPod music player constitute an abuse under Article 82 of the EC Treaty? , Berkeley Center for Law & Technology.

²⁵⁵ See e.g. the case of *Blizzard & Vivendi Universal v Jung*, 422 F.3d 630 (8th Cir. 2005), where the court held that reverse engineering in order to emulate Blizzard software amounted to an illegal activity under the DMCA and the interoperability exception did not apply to the facts of the case. See also *Sony Computer Entertainment v Connectix Corp*, 203 F.3d 596 (9th Cir. 2000) and *Sony Computer Entertainment v Bleem*, 214 F.3d (9th Cir. 2000), where Sony sued the developers of two software emulating the Sony Playstation console in order to allow users to play Playstation games on their personal computers, and although the court ruled against Sony, the software of both Connectix Corp and Bleem have been discontinued. However, see *Chamberlain Group v Skylink Technologies* (Fed. Circuit, 2004) 381 F.3d, where the court held that the competing product produced by Skylink Technologies was not infringing the anti-circumvention provisions of the DMCA, which are meant to protect copyrighted content and not to regulate the aftermarket for a good; *Lexmark International v Static Control Components* (6th Circuit, 2004) 387 F.3d 522, where the court held that Lexmark could not rely on the anti-circumvention provisions of the DMCA in order to control the market of complementary goods.

²⁵⁶ A firm with a dominant position in the market of playback devices does not necessarily hold a dominant position in the market of digital music distribution. However, by foreclosing competition in the market of playback devices and by refusing to license the technology incorporated into its own playback devices, the dominant undertaking may reduce the ability of competitors to achieve sufficient economies of scale from the distribution of digital music. A number of competitors may therefore be driven out of the market as a whole, thus enabling the firm to establish itself as a dominant undertaking also in the market of digital music distribution. See LÉVÊQUE, F. (2006) Is Online Music Locked in by Leveraging? *Communications & Strategies*, 63.

²⁵⁷ The lower is the level of interoperability between DRM systems, the higher are the costs of switching from one system to another. Consumer will therefore stick to the old system whenever the cost of switching to another system is likely to overcome the expected benefits of the new system. For more details on the impact of switching costs upon consumer's lock-in, see MARINOSO, B. G. (2001) Technological Incompatibility, Endogenous Switching Costs and Lock-In. *The Journal of Industrial Economics*, 49. See e.g. the judgment of the Consumer Ombudsman of Norway with regard to the complaint against iTunes Music Store (whose report is available at <http://forbrukerportalen.no/>), where the Consumer Ombudsman of Norway strongly criticized Apple's refusal to disclose interoperability information concerning the FairPlay DRM and accused it to be using the DRM technology in order to lock the consumers into Apple's proprietary systems.

devices which, in turn, can only understand a particular set of data formats.²⁵⁸ After purchasing a particular type of content, consumers are therefore tied to one particular type of technology, from which they become increasingly unwilling to depart. As more and more DRM systems are being deployed, the issue of interoperability is becoming an ever more important concern for consumers, which has, so far, only been addressed by a few countries.²⁵⁹

E. LEVY SYSTEMS

In certain countries, in which the copyright regime permits the unauthorized reproduction of a work for personal and non-commercial purposes, a system of levies has been established allowing for private copies to be made as long as fair compensation is given.²⁶⁰ The system incorporates a compulsory tax into the price of any product or device that is likely to be used for the making of private copies, and provides for a redistribution scheme according to which every right holder should receive a fair level of compensation.

Originally introduced on the grounds that it was too difficult to control the reproduction of a work for the purpose of private use, levy systems might no longer be necessary in the digital realm. Indeed, the widespread deployment of DRM systems may seriously affect the operations of the levy systems and ultimately eliminate the need and justification for any mandatory system of levies.²⁶¹

²⁵⁸ Tying may occur by ensuring, on the one hand, that the content may only be played on a particular set of devices, and on the other hand, by requiring that any playback device to which the DRM technology has been licensed to be only capable of playing that particular type of technologically protected content. See e.g. Apple iTunes Music Store, whose content is technologically protected by the FairPlay DRM and may therefore only be enjoyed on Apple's iTunes software and Apple's iPod music players; Napster Music Store, whose content may be enjoyed only these software or devices which have been licensed to play WMA-protected subscription content (which excludes the iPod and most other portable players); RealNetworks Music Store, whose content may be played only on a narrow set of authorized devices which are compatible with the proprietary format of RealNetworks DRM.

²⁵⁹ In France, for instance, the Law n.2009-669 for the diffusion and the protection of creations on the Internet (more commonly known as the Hadopi law) provides for the establishment of a public and independent authority, "Hadopi" (Haute Autorité pour la diffusion des œuvres et la protection des droits sur Internet), whose main function is, inter alia, to monitor and ensure the interoperability of DRM systems.

²⁶⁰ See article 5(2) of the European Copyright Directive 29/2001/EC: "Member States may provide for exceptions or limitations to the reproduction right [...] (b) in respect of reproductions on any medium made by a natural person for private use and for ends that are neither directly nor indirectly commercial, on condition that the right holders receive fair compensation." Most countries of the European Community have implemented such an exemption by the means of a levy system (except for the UK which does not allow for private copying). The USA and Canada also introduced a particular system of levies, but only with regards to audio recording media (see, respectively, the US Audio Home Recording Act of 1992 and sections 81-82 of the Canadian Copyright Act).

²⁶¹ As a result of the widespread deployment of DRM systems, it may no longer be necessary to apply current levy systems into the realm of digital media. Either the copyright owners already obtained compensation by way of licensing fees, or they have given their consent to the making of private copies from which they may expect no compensation. Moreover, when applied to general purpose digital equipments, levy systems are likely have negative consequences from both an economic and social perspective, as users would end up paying a tax on virtually any digital device, which may be interpreted as an unlimited license to copy with copyright eventually turning into a liability regime. For more details, see: HUGENHOLTZ, P. B., GUIBAULT, L. & GEFFEN, S. V. (2003) *The Future of Levies in a Digital Environment*. Amsterdam, Institute for Information Law.

The reason is that, in the digital environment, the owners of the copyright in a work can now obtain direct compensation for any use of their work. By introducing a fee that every user must pay before the work can be enjoyed, DRM systems significantly reduces the legitimacy of the levy system, given that they provide right holders with a fair compensation by way of direct licensing fees or other forms of payment.²⁶² Moreover, in determining the proper amount of compensation that every right holder is entitled to, account should be taken of the fact that technological measures of protection may prevent users from availing themselves of certain copyright exemptions (i.e. private copying) which should therefore be excluded from the levy.²⁶³

The relation between technological measures of protection and the regime of fair compensation that has been established in certain jurisdictions under the form of a levy system may therefore need to be reassessed in view of the ubiquitous deployment of DRM systems.

²⁶² See recital 35 of the European Copyright Directive 29/2001/EC: “In certain cases of exceptions or limitations, right holders should receive fair compensation to compensate them adequately for the use made of their protected works or other subject-matter. [...] In cases where right holders have already received payment in some other form, for instance as part of a license fee, no specific or separate payment may be due. The level of fair compensation should take full account of the degree of use of technological protection measures referred to in this Directive. In certain situations where the prejudice to the right holder would be minimal, no obligation for payment may arise.”

²⁶³ See recital 39 of the European Copyright Directive 29/2001/EC: “When applying the exception or limitation on private copying, Member States should take due account of technological and economic developments, in particular with respect to digital private copying and remuneration schemes, when effective technological protection measures are available. Such exceptions or limitations should not inhibit the use of technological measures or their enforcement against circumvention.”

PRIVATE REGULATION: OPEN CONTENT

Every license necessarily involves an element of permission. In the context of copyright law, a copyright license is therefore a permission to do something that would otherwise constitute copyright infringement. Such permission may either be granted unconditionally to the public at large or be subject to the previous acceptance of particular terms and conditions.

As a general rule, most Open Content licenses can be regarded as instant licenses²⁶⁴ whose terms and conditions are usually incorporated within the work itself. Yet, as opposed to most proprietary licenses, Open Content licenses rely upon the copyright regime in order to create a series of positive rights to ensure the public availability of content and the free dissemination of knowledge.²⁶⁵ Even if there is no requirement that the work be necessarily given away for free,²⁶⁶ in practice, most of the works released under an Open Content license are released to the public at large and in exchange of no consideration.

²⁶⁴ The concept of “instant license” refers to the fact that it is no longer necessary to contact the copyright owner in order to obtain the license to exploit of a particular work. Instant licenses are automatic: the copyright owner decides upon the various terms and conditions according to which a work can be legitimately exploited and incorporates them directly into the work, as a result of which the user that legitimately obtain that copy of the work will be automatically subject to the terms and conditions of the license. See FRIPP, C. (2005) Instant licences move copyright into a new digital space: is it time to encourage Copyright Cannibals? *8th Symposium on Electronic Theses and Dissertations*. Sydney, Australia.

²⁶⁵ Intellectual property rights can be used negatively in order to restrict the exploitation of a work, or positively in order to enable the free dissemination of works and to promote the social contribution to the cultural heritage. Such a framework benefits both users, who can enjoy a broader availability of works, and right holders, whose rights remain protected by Intellectual Property laws so that no one may exploit a works in a manner that has not been provided for. See AIGRAIN, P. (2003) Positive Intellectual Rights and Information Exchange. IN CENTURY, M. (Ed.) *CODE*. MIT Press.

²⁶⁶ As a general rule, Open Content licenses do not preclude the commercial distribution of a work, although a number of Open Content licenses which do not allow for the commercial exploitation of a work are likely to prevent any licensee from distributing the work in exchange of a financial reward (see e.g. the non-commercial clause of the Creative Commons licenses, according to which the licensee “may not exercise any of the rights granted [...] in any manner that is primarily intended for or directed toward commercial advantage or private monetary compensation”). However, even if the licensee is entitled to distribute the work in exchange of a fee, the terms and conditions of the license, according to which the work can be freely reproduced and redistributed to anyone, cannot be modified by the licensee (see e.g. article 4(a) of the Creative Commons licenses: “You may distribute, publicly display, publicly perform, or publicly digitally perform the Work only under the terms of this License”) and the license generally prevent the licensee from imposing further restrictions on the rights granted by the license (see e.g. article 4(a) of the Creative Commons licenses: “You may not offer or impose any terms on the Work that alter or restrict the terms of this License or the recipients' exercise of the rights granted hereunder”). All users subsequently coming into possession of the work will therefore be entitled to redistribute the work for free, whether or not they originally had to pay for it.

After investigating the technical and legal aspects of this new emerging licensing practice, the research will subsequently address the various benefits that it may engender, as well as the legal challenges that must be faced in order to ensure the long-term sustainability of that particular scheme of licensing.

SECTION 1

TECHNICAL ASPECTS

In reaction to the recent expansion of the copyright regime,²⁶⁷ the Open Content community has endeavored to reduce the impact of the exclusive rights granted by default under the law. Open Content licenses allow for a work to be released under a particular scheme where only some rights are reserved: a level of protection that lies in between the default protection of the copyright regime, where almost all rights are reserved, and the negative status of the public domain, where no rights are reserved.²⁶⁸ Different copyright owners have different interests in their works. Some may wish for the utmost dissemination of their works, while nonetheless being able to earn money from the exploitation thereof. Others may prefer anyone being able to exploit their works, but nevertheless want to preserve the integrity thereof. Some may want to charge for only certain forms of exploitation, whereas others may want to charge only certain types of users. Open Content licenses offer copyright owners the possibility to license only these rights they do not want to enforce, while maintaining full control of the rights they are concerned with.²⁶⁹

As a result of the recent proliferation of Open Content licenses,²⁷⁰ providing a proper definition thereof has become extremely complicated. In spite of the different attempts which have been made thus far, there are still no generally accepted definitions of the term Open Content.

²⁶⁷ It may be argued that the legal protection of technological measures have subordinated the public ordering of copyright law to the private ordering of contract law. New contractual practices have however emerged, which, based on the copyright regime, have reintroduced the balancing principles of copyright law within the digital environment. See, VÄLIMÄKI, M. & HIETANEN, H. (2004b) Challenges of Open Content Licensing in Europe. Helsinki Institute for Information Technology. and MERGES, R. P. (2004) A New Dynamism in the Public Domain. *University of Chicago Law Review*, 71.

²⁶⁸ Open Content licenses are a compromise between a situation of total control, where every usage of a work is completely regulated ("all rights reserved"), and a situation of anarchy, where every work is left vulnerable to complete exploitation ("no right reserved"). A situation with "some rights reserved" constitutes a more moderate balance between these two extremes. See Creative Commons (2007) Some Rights Reserved: Building a Layer of Reasonable Copyright, www.creativecommons.org

²⁶⁹ See CLARKE, R. (2003) Copyright: The Spectrum of Content Licensing.

²⁷⁰ Perhaps the most popular examples of Open Content licenses are the Creative Commons, a set of licenses that endow users with various degrees of liberties. Other popular Open Content licenses are the GNU Free Documentation license and the Apple Common Documentation license, for the distribution of handbooks and other functional documents, the Open Music licensing scheme and the Audio license of the Electronic Frontier Foundation, for the distribution of musical works, and the Free Art license, regarded as the first license to have effectively transposed the ideology of the Open Source into the domain of the arts. For a general overview of the different Open Content licenses and of their respective popularity, see KUMAR, V. (2008) Open Licenses and Content Distribution. *Emerging Trends and Challenges in Library and Information Services*.

The Open Knowledge Definition established a set of principles that may help determine the status of a work through the identification of eleven conditions which have to be satisfied for a particular piece of content to be regarded as “open knowledge”: (1) the work must be universally available; (2) the license must allow for the work to be freely redistributed and (3) freely modified; (4) the work may not be released in a format allowing for technological restrictions to prevent the performance of any of the rights that have been granted by the license; (5) the license may require that proper attribution be given and (6) that derivative works be distributed with a different name and/or version than the original work; (7) the license cannot discriminate against any person or (8) against any specific field of endeavor; (9) the terms and conditions of the license must automatically apply to anyone to which the work has been redistributed; (10) the license must not be specific to a particular package but should only refer to the work per se, and (11) it cannot restrict the distribution of other works distributed along with the licensed work.²⁷¹

Similarly, the Free Cultural Works definition identifies the four freedoms that must be necessarily incorporated into a Free Cultural license: (1) the freedom to use and to perform the work; (2) the freedom to study the work and to apply the acquired information in any way and for any purpose; (3) the freedom to redistribute copies of the whole or only part of the work; and (4) the freedom to make and to redistribute derivative works. However, the respect of these four freedoms is a necessary but per se not sufficient condition to ensure the free status of the work – together with the four conditions necessary for a work to be regarded as a Free Cultural Work: (1) the free availability of source data; (2) the availability of the work in a free data format; (3) the absence of technical restrictions that are in conflict with any of the freedoms granted by the license; and (4) the absence of other legal restrictions or limitations that may negatively affect the exercise of the four essential freedoms.²⁷²

As such, the term Open Content is a general concept whose definition may ultimately encompass different categories of works. While the common denominator is that they all grant the right to freely reproduce and distribute a work for non-commercial purposes, Open Content licenses differentiate themselves according to the extent to which they allow or prohibit a more extensive exploitation of the work. For instance, although the access to a work is unconditionally permitted, the exploitation thereof may sometimes be restricted by certain formal or legal requirements²⁷³ which constitute the core characteristics of many Open Access licenses.²⁷⁴

²⁷¹ See <http://www.opendefinition.org/>

²⁷² See <http://freedomdefined.org/Definition>

²⁷³ As for the formal requirements, a very common condition of Open Content licenses is that proper attribution be given to the authors of the work. Another common restriction is to require that a copy of the license or a reference thereof be distributed along with the work, so as to ensure that anyone subsequently coming into possession of the work may unequivocally find out under which terms and conditions can it be legitimately exploited. Sometimes, the license also prohibits the use of any technological measure of protection that may impede the legitimate exploitation of the work. As for the legal aspect, the modification or the making of derivative works may be expressly prohibited or otherwise subject to the condition that the resulting work be distributed under the same terms and conditions as the original work. See, e.g. the GNU Free Documentation License and the Creative Commons licenses BY-SA and BY-NC-SA. Sometimes, the overall exploitation of the work may also be confined to a particular category of users or to a particular type of exploitation. See, e.g. the Creative Commons licenses BY-NC, BY-NC-ND or BY-NC-SA, and the Creative

One particularity of the digital environment is that the consumption of works has developed from a system based on the distribution of physical copies, into a system of access privileges where users merely acquire access to the work.²⁷⁵ Given that any additional access does not involve any additional costs, it is up to the copyright owner to decide whether access should be granted for free or in exchange of specific consideration.

The notion of a gift economy²⁷⁶ has emerged within the information society, where information goods are not traded for a specific consideration but on the prospect of reciprocity and mutual obligations to share. In particular, as anyone can engage in creative activities without relying upon any sort of intermediaries, user-generated content is assuming a predominant function in the digital environment²⁷⁷ which is often capable of providing economic returns even though it is made publicly available on the Internet.²⁷⁸ Although free of charge, most works released under an Open Content license are not given away for nothing. Consideration may sometimes subsist within the concept of indirect reciprocity (e.g. by way of enhanced social status or other intangible rewards) or deferred reciprocity (according to which compensation will only be received later in time).²⁷⁹

Archive licenses, which allow for the introduction of a series of territorial restrictions, together with a number of limitations with regard to the field of endeavor.

²⁷⁴ Open Access licenses are more restrictive Open Content licenses that may not authorize the making of derivative works without the consent of the copyright owner and may introduce specific restrictions with regard to the commercial exploitation of a work. The work remains nevertheless freely accessible by anyone and can be reproduced and redistributed for non-commercial purposes, provided proper attribution is given and every formality is fulfilled. For an overview of the different definitions of Open Access, see: BAILEY, C. W. (2006) What is Open Access? IN JACOBS, N. (Ed.) *Open Access: Key Strategic, Technical and Economic Aspects*. Oxford, Chandos Publishing.

²⁷⁵ Traditionally, works have been distributed to the public through the transfer of physical copies. Online distribution, however, does not necessarily involve the distribution of copies (albeit intangible) but only the transmission thereof. See ELKIN-KOREN, N. (1996) Public/Private and Copyright Reform in Cyberspace. *Journal of Computer-Mediated Communication*, 2.

²⁷⁶ The advent of the digital technologies has led to the emergence of a strong set of ideals, which advocate the free circulation of knowledge and the sharing of culture as a common, in line with the principles of the “gift economy” (see CHEAL, D. (1998) *The Gift Economy*, Routledge. as well as CASTELLS, M. (2001) *The Internet galaxy: Reflections on the Internet, business and society*, Oxford University Press. introducing the concept of the gift economy to describe the mechanisms of Open Source).

²⁷⁷ With the advent of the Web 2.0 technologies, an increasing number of web platforms are being developed for the hosting and the sharing of user-generated content (e.g. chats, blogs, forums, wikis, personal homepages, video and photo repositories). A comprehensive review of the different platforms can be found at: OECD (2007) *Participative Web and User-Created Content: Web 2.0, Wikis and Social Networking*.

²⁷⁸ Content can be either commercialized as a copyright work as such or as a constituent of a broader service: e.g. by way of subscriptions and/or pay-per-item models. Content may also be employed as a value-adding mechanism in order to increase the value of other goods or services. In addition, advertising and/or merchandising mechanisms may sometimes be used as a form of remuneration, in order to shift the costs away from the consumer onto a third party (such as the advertiser or sponsor). For a more thorough overview of alternative business models in the digital environment, see CLARKE, R. (2004) *Open Source Software and Open Content as Models for eBusiness. 17th International eCommerce Conference*. Bled, Slovenia.

²⁷⁹ It is generally assumed that consideration is immediate and reciprocal. There exists however many situations in which consideration is neither immediate nor reciprocal. Something that may at first sight appear as altruistic behavior could, in fact, be regarded as a standard transaction in a market economy if one takes into account the possibility of deferred reciprocity (giving a thing

LEGAL STATUS

In spite of their increasing popularity, the nature and the legal status of many Open Content licenses is still open to debate. In the context of property law, in a majority of common law jurisdictions, the issue is addressed though the distinction between a bare license (i.e. the implied permission, granted without consideration, to use the property of another) and a contractual license (i.e. the permission, granted in exchange of valuable consideration, to use the property of another, derived from an express or implied contract).

Whether Open Content licenses should be regarded as bare licenses or as contractual agreements is an important question, which may affect not only the manner in which the provisions of the license are to be interpreted, but also the extent to which their terms and conditions can be enforced and the nature of the remedies available upon breach.²⁸⁰ The problem is that it can be very difficult to draw a line between what constitutes a contractual license and what may instead only be regarded as a bare license.

A bare license is merely a waiver of rights. It amounts to a unilateral permission granted by the licensor, for the licensee to perform an act that would have otherwise been prohibited by law.²⁸¹ While the licensor undertakes not to sue anyone who respects the terms of the license, the establishment of a bare license does not require the consent of the licensees because it does not create any kind of obligation on their part.²⁸² In the context of a public license, in fact, no licensee needs to have been previously identified.²⁸³

in order to subsequently get an analogous thing back from the same person) and indirect reciprocity (giving a thing in order to get another thing back from anyone who is part of the community). See CLARKE, R. (2007) Business Models to Support Content Commons. *SCRIPT-ed*, 4.

²⁸⁰ The procedure to enforce the terms of a license and the remedies available may vary according to whether the license is regarded as a bare license or as a contractual license. For instance, if a licensee breach of the terms of a contractual license, all contractual obligations may come to an end and the licensee will have to pay damages and/or execute a specific performance. If the licensee acts beyond any of the rights granted by a bare license, instead, the licensee be liable of copyright infringement and the term of the license may only be enforced in accordance with the provisions of copyright law. For more details, see HIETANEN, H. (2007) A License or a Contract: Analyzing the Nature of Creative Commons Licenses. Helsinki Institute for Information Technology.

²⁸¹ According to the Encyclopedia Britannica, a bare license occurs when a person enters or uses the property of another with the express or implied permission of the owner and without any obligation in return. With reference to Intellectual Property law, the Merriam-Webster's Dictionary of Law describe a bare license as a grant by the holder of a copyright of any of the rights embodied in the copyright, short of an assignment of all rights.

²⁸² A bare license is a unilateral act, whereby the owners of a resource independently impose limits upon their rights to exclude others from that resource. See ELKIN-KOREN, N. (2005) What Contracts Can't Do: The Limits of Private Ordering in Facilitating a Creative Commons. *Fordham Law Review*, 74.

²⁸³ A public license is created whenever the licensor does not identify nor impose any limit on who may qualify as a potential licensee but merely grants the license to the general public. See e.g. the GNU General Public License at www.gnu.org/copyleft/gpl.html, and the various Creative Commons Licenses available at <http://creativecommons.org/licenses>.

If they were to be regarded as a bare license, Open Content licenses could only be enforced by the copyright owner in accordance with the provisions of copyright law and any condition that extends beyond the scope of the copyright regime could therefore not be enforced.²⁸⁴ Moreover, to the extent that reasonable notice has been given, a bare license involving no consideration could theoretically be revoked.²⁸⁵ However, in certain jurisdictions, the licensor may be precluded from terminating a license that purports to be irrevocable or which has already been acted upon under the doctrine of promissory estoppels.²⁸⁶

A contractual license is a more complex legal construct, which is formed whenever the offer of the licensor has been unconditionally accepted by the licensee.²⁸⁷ Acceptance can be anything that constitutes a positive manifestation of assent,²⁸⁸ and, once the license has been accepted by the licensee, it can no longer be revoked without the mutual consent of the parties.

As opposed to a bare license, which is merely concerned with the licensing of pre-existing rights, a contractual license is capable of creating new rights and obligations that did not exist before. Depending upon the relationship that subsists between the licensor and the licensees, a contractual license may be regarded as either a unilateral contract, where only the licensor undertakes to assume a certain number of obligations,²⁸⁹ or as a bilateral contract, where both parties commit themselves to their respective obligations.²⁹⁰

²⁸⁴ See e.g. *Bobbs-Merrill Co. v. Straus*, 147 F. 15 (2d Cir. 1906), aff'd, 210 U.S. 339 (1908), where the licensing practices of a book publisher who licensed the right of distribution under the condition that the books be sold at a fixed retail price was seen as an illegitimate attempt to impose contractual condition upon the sale of the book by third parties. According to the Court, such a condition could therefore only be secured by the means of a positive contractual agreement between the parties.

²⁸⁵ For more details on the conditions in which a licenses should be regarded as being revocable or not, see *infra*, Part I. Chapter 4: Private Regulation: Open Content. Section 4.B: Revocability.

²⁸⁶ For more details, see HILL, J. (2001) The Termination of Bare Licences. *The Cambridge Law Journal*, 60.

²⁸⁷ For a critical discussion on the fundamental requirements of contract formation, see ASHLEY, C. D. (1903) Mutual Assent in Contract. *California Law Review*, 3. and COHEN, M. R. (1933) The Basis of Contract. *Harvard Law Review*, 46.

²⁸⁸ Although acceptance is generally established from an explicit manifestation of intent, it can also be deduced from a particular course of action that shows that the party intended to enter into the contractual relationship. See TIERSMA, P. M. (1986) The Language of Offer and Acceptance: Speech Acts and the Question of Intent. *California Law Review*, 74. With regard to Open Content licenses, acceptance of the terms and conditions of the license might be presumed by the fact that the user is reproducing and/or distributing a work, whose exploitation is protected by copyright law and would therefore amount to copyright infringement were the user not to have accepted the license. See e.g. the GNU General Public License, which specifically provides that assent occurs “by modifying or distributing the Program (or any work based on the Program).”

²⁸⁹ A unilateral contract is a promise by one party (the offeror) to do something in exchange for actual performance by the other party (the offeree). Performance by the offeree constitutes acceptance and consequently creates a legal obligation for the offeror to fulfill the contract.

²⁹⁰ A bilateral contract is an exchange of promises between two parties (the offeror and the offeree), where the promise of each party constitutes consideration for the promise of the other party. A bilateral contract, therefore, may be enforced against both the offeror and the offeree, who are both legally bound by their respective obligations..

The problem is that certain legal systems do not consider a contract to be valid unless it is supported by consideration.²⁹¹ In those jurisdictions, certain Open Content licenses may therefore fail to qualify as a valid contract to the extent they do not involve proper consideration. The license will therefore be considered as an invalid contract whose provisions cannot be enforced. However, to the extent that it at least qualify as a bare license, it may nonetheless be possible to rely upon the doctrine of promissory estoppels in order to enforce the promise that has been made by the licensor.²⁹²

Whether they purport to be a contract or a bare license, the nature of an Open Content license is generally difficult to ascertain because it depends both on the distinctive characteristics of license and on the legal system in which it is being assessed.²⁹³ Establishing the legal status of an Open Content license is however necessary in order to determine the extent to which its various terms and conditions can be enforced under various bodies of law. If the license qualifies as a contract, its corresponding terms and conditions may extend beyond the scope of the copyright regime, and the breach of any of the licensing provisions may therefore be enforced by the licensor either under copyright law or under contract law. Conversely, if the license fails as a contract, it may nonetheless be regarded as a bare license, whose terms and conditions may therefore only be enforced under copyright law in so far as they do not unduly restrain the exploitation of the work in excess of what has been provided for under the copyright regime.

In spite of the importance they are assuming in the Internet network, there have been so far only a few judicial precedents addressing the legal status of Open Content licenses.

²⁹¹ In most common law jurisdictions, a contractual obligation is binding on any one party only to the extent that it is reciprocated by any other party with another contractual obligation. Consideration can be given at the moment in which the contract is formed (e.g. in the case of unilateral contracts) or be promised in the future (e.g. in the case of bilateral contracts) but it may not relate to anything done in the past. For more details see: ASHLEY, C. D. (1913) The Doctrine of Consideration. *Harvard Law Review*, 26.

²⁹² Estoppel is an equitable doctrine that can be found in the jurisdiction of many common law countries. In the context of Open Content licenses, if the licensee exploits a work in such a way that would amount to copyright infringement under the belief that the license constitutes a valid and enforceable contract, great loss would be incurred were the licensor to bring an action for copyright infringement. Promissory estoppels, therefore, might perhaps be used as a substitute for consideration in Open Content license. See ROSEN, L. & EINSCHLAG, M. B. (2004) Taxonomy of Licenses. *Open Source Licensing, Software Freedom and Intellectual Property Law*. Prentice Hall.

²⁹³ It is difficult to draw a sharp line between a contract and a bare license. The provisions of conditional licenses may in fact be interpreted as either a restriction on the scope of the copyright license or as a supplementary contractual obligation constraining the actions of the licensee. See e.g. the case of *Jacobsen v Katzer et al.*, where the court held that the provisions of the Artistic license requiring every licensee to distribute the licensed work together with the appropriate copyright notice was not a limitation of the copyright license but a contractual covenant that could therefore only be enforced in accordance with the provisions of contract law. (See Case 3:06-cv-01905-JSW, Northern District Court of California, 2006). Moreover, since every jurisdiction has different rules and principles concerning what may be regarded as a valid contractual agreement, it is impossible to unequivocally characterize a given Open Content license as either a bare license or as a contractual license. In fact, while a license that requires no consideration will be likely not to qualify as a contract in most common law jurisdiction, but it does not necessarily mean that the same license may not be regarded as a contract in another jurisdiction where consideration is not considered an essential requirement of a contract. A single Open Content license may therefore be regarded as a contract in a particular legal system, although it may only amount to a bare license in another. See HIETANEN, H. (2007) A License or a Contract: Analyzing the Nature of Creative Commons Licenses. Helsinki Institute for Information Technology.

The validity of the Creative Commons licenses has first been addressed in Spain in the case of *SGAE v Luis*,²⁹⁴ where the court held that the licenses were invalid because they lacked a signature; and later in the case of *SGAE v Fernandez*,²⁹⁵ where the court finally acknowledged the legitimacy of the licenses as a valid legal instrument. In the Netherlands, not only did the case of *Curry v Audax*²⁹⁶ confirm the validity of the Creative Commons licenses, but it also endorsed the enforceability of their various terms and conditions. More recently, in the USA, a series of lawsuits have been filed against the infringement of Creative Commons licenses on the basis of copyright infringement and breach of contract.²⁹⁷ Finally, certain statutory instruments have expressly recognized the legitimacy of Open Content licenses, such as, for instance, the French Code de la propriété intellectuelle, which specifically provides for the possibility to license the copyright in a work without any consideration to be given in return.²⁹⁸

²⁹⁴ See *SGAE v JoseLuis* (Audiencia Provincial de Pontevedra, Sentencia de 29 Nov. 2005, rec. 3008/2005), where the Spanish collecting society SGAE claimed that the owner of a cafe bar that only plays music released under Creative Commons licenses nevertheless had to pay copyright royalties for the public performance of the musical works. According to the court, since the defendant could not prove that none of the songs played in the premises constituted a commercial music track, the defendant should pay adequate royalties to the collecting society. (Note that Court regarded the Creative Commons licenses as a mere informative leaflet about the contents of the license but without any legal value because they lacked a signature).

²⁹⁵ See *SGAE v Ricardo Andres Utrera Fernandez* (Juzgado de Primera Instancia de Badajoz, Procedimiento Ordinaria 761/2005, Sentencia N. 15/2006), where the Spanish collecting society SGAE claimed that the owner of a disco bar that only plays music released under Creative Commons licenses nevertheless had to pay copyright royalties for the public performance of the musical works. According to the court, however, the SGAE could not collect the royalties in the name of right holders it did not represent. (Note that, while the court actually considered the Creative Commons licenses to be a valid legal instrument, if the right holders were actually represented by the SGAE, the outcome of the case would have been quite different, since the SGAE require every artist it represents to transfer the right of public performance in any current and future work to the collecting society, so that the Creative Commons licenses would have not been effective in any case).

²⁹⁶ See *Curry v Audax* (District Court of Amsterdam, Case no. 334492 / KG 06-176 SR, 2006), where a magazine publisher was held liable of copyright infringement for having published certain pictures released under the Creative Commons license: Attribution-Noncommercial-Sharealike. According to the court, by releasing the work under that particular license, the copyright owner had maintained the exclusive right to authorize any commercial use of the work and any commercial exploitation of the pictures would constitute copyright infringement. (This case constitutes an important precedent as it confirms the fact that the terms and conditions of an Open Content license can be effectively enforced in court against any sort of abusive exploitation).

²⁹⁷ See e.g. *Chang v. Virgin Mobile* (2007), where Virgin Mobile was sued for taking a photograph from Flickr and using it into an advertisement without the consent of the author and without acquiring permission from the person represented into the photograph. Although the photographs had been released under a Creative Commons Attribution-only license, which allow for anyone to reproduce, redistribute and communicate the work to the public for any purpose whatsoever, the Court nonetheless held that the use of the photographs by Virgin Mobile were to be regarded as a breach of the licensing provisions because it failed to provide adequate attribution to the author; see also *GateHouse Media Inc. v That's Great News*, No. 10-50164 (N.D. Ill. Filed 6/30/2010), where the defendant has been accused to have violated the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives license under which the plaintiff's works had been released. In addition to a claim of copyright infringement and unfair competition, the plaintiff also brought an action against the defendant's commercial use of the licensed material under a claim of breach of contract.

²⁹⁸ See e.g. Article L.122-7-1 of the French Code de la propriété intellectuelle (introduced by Law N.2006-961 of 1 August 2006 on copyright and related rights in the information society – the DADVSI law), which provides that authors are free to make their works *freely* available to the public, subject to the rights of possible co-authors or third parties and in compliance with the agreement they have concluded (emphasis added).

BENEFITS

Open Content licenses are being widely employed to release an ever-increasing amount of content on the Internet. Although completely unacquainted with most of the legal challenges concerning the licensing thereof, end-users are progressively starting to understand the advantages that can be derived from releasing a work under an Open Content license. Many users are, nowadays, evolving into active producers of information, who collaborate towards the production of socially valuable content by creating or modifying new or pre-existing works. User-generated works are often released under an Open Content license in order to encourage the maximum dissemination thereof, while nevertheless maintaining a certain degree of the control over the manner in which they can be exploited.

While the underlying reasons that motivate a growing number of users to enter the Open Content community are particularly difficult to identify,²⁹⁹ the benefits that may derive from the widespread adoption of Open Content licenses can be quite easily established with regard to the authors themselves and the community at large.

In particular, although they are actually reshaping the provisions of the copyright regime,³⁰⁰ Open Content licenses were originally conceived with the very same objectives as copyright law, as both purport to

²⁹⁹ The driving forces which may lead authors to release their content under an Open Content license may involve a large variety of incentives of any technical, economic, social or political nature. In particular, social incentives may include the pleasure of cooperating and interacting with other people on the development of a collaborative project, or the self-realization deriving from the satisfaction of learning new things. Altruism may also play an important role, together with the idea of reciprocity, according to which the author may receive quality feedback in exchange of giving away the content for free. Political motivations are generally related to the various levels of fame, reputation and prestige that may be acquired from participating into a given Open Content project. Economic motivations, such as the publicity deriving from the widespread dissemination of works and the possibility to use Open Content as an alternative business opportunity or in order to acquire indirect revenues from complementary markets may also considerably contribute to the adoption of an Open Content licensing scheme. Finally, technical motivations relates to the practical difficulty of producing a large and labor-intensive work without being able to rely on the contribution and the collaboration of a large number of individual users. Ultimately, however, the best explanation is probably a mix of all these different driving forces, the combination of which is likely to vary for each individual author and for every category of work. For a classification of the driving forces leading people to engage into an Open Source project, see FELLER, J. & FITZGERALD, B. (2002) *Understanding Open Source Software Development*, London, Addison-Wesley. For the corresponding analysis of the driving forces leading to the adoption of Open Content licensing, see CEDERGREN, M. (2003) Open Content and Value Creation. *First Monday*, 8.

³⁰⁰ The default level of protection provided by the copyright regime ("all rights reserved") may not always be the most appropriate level of protection for every work and circumstance. If copyright owners can release their works under less restrictive terms and conditions by maintaining only the restrictions they are actually concerned with ("some right reserved"), users will thus able to extract more value from these works with no detriment to the interests of right holders. See e.g. Lawrence Lessig, claiming that the copyright system should be adapted to fit the new circumstances of the digital environment, in LESSIG, L. (2004) *Free Culture*, New York, The Penguin Press. and Yochai Benkler, condemning the proposition that if some property rights in information are good, more rights in information are even better, in BENKLER, Y. (2001) A Political Economy of the Public Domain: Markets in Information Goods versus the Marketplace of Ideas. IN DREYFUSS, R. C. & ZIMMERMAN, D. L. (Eds.) *Expanding the Boundaries of Intellectual Property: Innovation Policy and the Knowledge Society*. Oxford University Press.

contribute to the advancement of the public good by encouraging the production and the dissemination of creative works.

One of the main goals of the Open Content community is to promote the widespread dissemination of knowledge and the preservation of the cultural heritage for present and future generations.³⁰¹ The goal is to provide broader access to knowledge and to ensure global availability of information. In the last years, in particular, a large number of initiatives have emerged over the Internet in order to provide opportunities for users to make their content freely available in the digital environment.³⁰²

Open Content licenses are not limited to promoting the free flow of information and the widespread dissemination of knowledge. They may also be employed to foster innovation and to encourage the creation of new works or the development and enhancement of previous works. If every work necessarily builds upon

³⁰¹ One the one hand, the public good may only be achieved when knowledge is made available to a maximum number of persons, which should be entitled to use, reuse, and further redistribute it. On the other hand, however, the cultural heritage must also be protected against certain forms of undue appropriation and/or excessive exploitation. Open Content licenses, with the concept of "some rights reserved" have been a successful attempt to reconcile these two necessities, by encouraging the widespread dissemination of knowledge, while at the same time ensuring that it will be made equally available in the future. For more details, see KANSA, E. C., SCHULTZ, J. & BISSELL, A. N. (2005) Protecting Traditional Knowledge and Expanding Access to Scientific Data: Juxtaposing Intellectual Property Agendas via a "Some Rights Reserved" Model. *International Journal of Cultural Property*, 12.

³⁰² The emergence of Open Content licenses purports to promote the global availability and the widespread dissemination of creative works, by allowing (at least) their free reproduction and distribution. See, e.g. the Internet Archive database (<http://www.archive.org>) and the Wikimedia Commons project (<http://commons.wikimedia.org>), two major digital media repositories with a broad assortment of Open Content material of different sorts; the various projects of the Wikimedia Foundation (<http://wikimedia.org>), including projects such as Wikipedia, Wiktionary, Wikinews, Wikiversity, Wikibooks, etc., entirely based on users' contributions; the Open Library (<http://www.openlibrary.org/>), a digital library of Open Content and Public Domain literary works; the Wikisource project (<http://wikisource.org>), an online library of free content publications collected and maintained by the community; the Open Clip Art Library (<http://www.openclipart.org/>), an archive of user contributed clip art that can be used by anyone; the Flickr repository (<http://www.flickr.com>), a photo sharing website which offers users the ability to release their images under certain Open Content licenses; the Jamendo initiative (<http://www.jamendo.com>) and the Simuze music platform (<http://www.simuze.nl/live>), two music sharing platforms dealing exclusively with musical content released under Open Content licenses; the BBC's Creative Archive (<http://creativearchive.bbc.co.uk/>), whose slogan "Find it. Rip it. Mix it. Share it." clearly expresses the objectives of the initiative, the Swarm of Angels (<http://aswarmofangels.com>), an open source film project, whose aim is to make the world's first Internet-funded, crewed and distributed feature film; the Work Book Project (<http://workbookproject.com>), an Open Source social experiment for content creators; the MakeZine blog (<http://www.makezine.com>), a video blog which requires all clips to be released under the Creative Commons licenses, the Project Gutenberg (<http://www.gutenberg.org>) and the ManyBooks initiative (<http://manybooks.net>), two large libraries of e-books whose content has been released under an Open Content license or whose copyright has expired; the LibriVox project (<http://librivox.org>), which provides free audiobooks from the public domain; the Open Books Project from O'reilly (<http://www.oreilly.com>), where books are released under an Open Content license whenever the books have gone out of print and/or the author agrees to give them away for free; the Friday Project (<http://www.thefridayproject.co.uk>) and the Penguin Publishing House (<http://www.penguin.co.uk>), two publishing companies that specialize in the publishing of books which can be freely accessed on the web under a non-commercial Open Content license, etc. See also the constantly increasing number of Open Access journals (for a full overview see the directory of open access journals at <http://doaj.com>) and the various initiatives launched by prominent institutions such as the MIT's OpenCourseWare (<http://ocw.mit.edu>) and the RICE University's Connexions Repository (<http://cnx.rice.edu/browse/>) to release educational resources under Open Content licenses.

prior knowledge,³⁰³ Open Content licenses allowing for the making of derivative works will ultimately facilitate the process of cumulative innovation³⁰⁴ by reducing the costs that would otherwise be incurred in order to identify the owners of the copyright in a work and to obtain a license from them.³⁰⁵ Moreover, the recent deployment of new platforms of cooperation based on Open Content licenses³⁰⁶ are likely to encourage the creation of collaborative works by providing a mechanism for the aggregation of several contributions into one collective work, the quality of which can ultimately be ensured through peer review.³⁰⁷

³⁰³ Authors do not create out of nothing. A work of authorship is the output of a process which requires other works of authorship as an input. Every new work is to a certain extent based on previous works, which may have been processed, adapted, converted, transformed, developed and recombined (whether consciously or not) in the mind(s) of the authors(s). Authors cannot produce a new work without the necessary raw material. They need to take from the world that surrounds them in order to create something new, which necessarily builds upon the past. See LITMAN, J. (1990) *The Public Domain*. *Emory Law Journal*, 39.

³⁰⁴ The process of innovation in the information industries differs from the innovative process in more conventional industries, in that information is both an output and an input of the innovation process and its success is heavily dependent on the external contributions of users and/or competitors. Strictly speaking, in the creative industries, every innovation is cumulative to the extent that it builds upon the knowledge of previous works. For the purpose of copyright law, however, cumulative innovation occurs when an author takes a substantial part of a work and uses it for the creation of a new work which the law would regard as an infringing work in view of the substantial similarity with the previous work. For more details on the process of innovation in information, see CLARKE, R. & DEMPSEY, G. (2004) *The Economics of Innovation in the Information Industries*.

³⁰⁵ In the framework of copyright law, cumulative innovation may only be achieved when an author is capable of obtaining a license with regard to every work necessary for the production of a derivative work. See e.g. SCOTCHMER, S. (1991) *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law*. *Journal of Economic Perspectives*, 5, arguing that it is necessary to stimulate cumulative innovation and the production of new information by remunerating current innovators for their new contributions, while simultaneously providing a proper remuneration to the previous innovators who produced the knowledge necessary for the new contributions to be made. However, excessive transaction costs may sometimes discourage the author from producing the derivative work, whenever the costs cannot be compensated by the expected benefits resulting from the creation of the work. See BENKLER, Y. (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press. Open Content licensing may instead facilitate the process of cumulative innovation by considerably reducing the transaction costs to be incurred for the exploitation of a work released under a license which specifically allows for the making of derivative works.

³⁰⁶ Building on the model of OpenSource software development, Open Content licenses allow for the production of collective works resulting from the collaboration of many different users from different parts of the world. See e.g. the various Wikis (such as Wikipedia, Wikibooks and Wikinews) where anyone is entitled to contribute by adding, editing, correcting or deleting the contribution of anyone else. See also the Open Directory Project (<http://www.dmoz.org>), one of the most comprehensive directories of the web, which exclusively consists of the contributions of users.

³⁰⁷ The greater the number of people involved in the production and the consumption of a work, the more the quality of the work can be ensured, since a larger number of persons will be able to intervene and correct any potential imperfection. The work can thus be continuously improved by way of an ongoing peer-review. See e.g. Eric Raymond, claiming that an extensive peer-review by an unlimited number of people is one of the main advantages of the Open Source model of software development. In RAYMOND, E. S. (1999) *The Cathedral and the Bazaar*, O'Reilly. With regard to Open Content, see e.g. Wikipedia (<http://www.wikipedia.org>) and Nupedia (<http://www.nupedia.org>), two online encyclopedia based on user contributions with very different mechanisms of peer-reviews (Nupedia has a very hierarchical organization with a strict division of roles, whereas Wikipedia allows anyone to contribute and to edit the contributions of others); Slashdot (<http://slashdot.org>), a website for users to post technology-related news, whose posts are moderated through a complex mechanism of peer-review whereby every user who has become a moderator can assign a specific score to each post, which will be added to the total score according to the relative karma of each moderators.

In an attempt to maximize the production and the dissemination of works, Open Content licenses are also concerned with the protection of private interests and individual values. In line with the principles of the gift economy,³⁰⁸ works are released under an Open Content license not only for the purposes reciprocity, gratitude, or solidarity,³⁰⁹ but also with the expectation of obtaining rewards of personal nature, such as status, prestige or self-esteem.³¹⁰ By allowing for the free reproduction and distribution of content, authors may acquire substantial fame and reputation as a result of the widespread dissemination of their works,³¹¹ the popularity of which theoretically results from their intrinsic value for society than it does from the amount of marketing expenses.³¹² In addition, even if they have been released under an Open Content license, authors do not necessarily lose control over the exploitation of their works. Not only can they introduce a series of

³⁰⁸ A gift economy is a particular economic system where transactions are governed by social rather than economic principles. Traditionally regarded as a distinctive feature of certain small communities and tribal societies, after the advent of the digital technologies and the development of the Internet network, a gift economy also emerged in certain subcultures of the Information Society, where digital goods are given away without the prospect of receiving any consideration in return and the practice of gift giving is regarded as a fundamental instrument to create and reinforce social relationships. See, CHEAL, D. (1998) *The Gift Economy*, Routledge. See, also, Manuell Castells, drawing upon the concept of the gift economy in order to describe the mechanisms of Open Source, in CASTELLS, M. (2001) *The Internet galaxy: Reflections on the Internet, business and society*, Oxford University Press.

³⁰⁹ Open Content licensing can be regarded as a form of social solidarity, according to which works are made freely available without the expectation of receiving any direct *quid pro quo*. Releasing a work under an Open Content license is however likely to give rise to a indirect form of social reward, which may result from the establishment of new social relationships, from the satisfaction deriving from doing something good for the others and for the community, and/or from the opportunity to benefit from the other works which have released under an Open Content license as a form of reciprocity. On the model of the Open Source community, the Open Content community has therefore succeeded in creating a gift economy based on principles of solidarity and reciprocity, where works made available for free in exchange of social rewards. See, with regard to the Open Source model: HEMETSBERGER, A. (2002) Fostering cooperation on the Internet: social exchange processes in innovative virtual consumer communities. *Advances in Consumer Research*, 29.

³¹⁰ Peer recognition is a key factor in the artistic community, which may sometimes be regarded as being more important than economic rewards. By releasing a works under an Open Content license, the work will enjoy extensive visibility which may result in a broader recognition of the author. Being recognized by their peers could therefore constitute a valuable reward for authors, which may simultaneously satisfy their desire for fame and self-esteem, thereby encouraging further participation in the Open Content community. For a discussion on the role of recognition in motivating individuals' participation to a common goal, see: LOCH, C., YAZIJI, M. & LANGEN, C. (2001) The Fight for the Alpha Position: Channeling Status Competition in Organizations. *European Management Journal*, 19.

³¹¹ Fame constitutes an important incentive for authors to create, and certain artists may be more motivated by the pursuit of fame than by the prospects of economic rewards. See, SHAW, R. R. (1951) Copyright and the Right to Credit. *Science*, 113. Open Content licensing could be a valuable instrument for authors to acquire fame and reputation by promoting the widespread distribution of their works. Moreover, since the commercial success of most artists mainly depends on their fame, authors could eventually exploit their reputation in order to earn additional revenues on complementary activities (such as, e.g. lectures, concerts, merchandising), in order to obtain additional funding or sponsorships and/or in order to undertake new commercial activities.

³¹² Open Content licensing allows authors to compete in the market for creative works according to the actual merit of their contributions and not according to how much money they have spent in making their works popular. In fact, the viral nature of the Internet network allows for the content regarded as the most valuable by the public to spread almost instantaneously all over the world, so that the popularity of every works is ultimately determined by their intrinsic value for society.

limitations concerning the manner in which and the extent to which their works can be exploited,³¹³ but they can also regulate the making of derivative works³¹⁴ and determine the terms and conditions under which they should be released.³¹⁵ Finally, in order to ensure the authenticity and the integrity of their works, or to keep track of the way in which their works are being consumed, right holders could theoretically release their works under an Open Content license in combination with a series of technological measures or in the framework of a DRM system.³¹⁶ However, this sort of release would only be valid to the extent that DRMs and other technological measures have not been expressly forbidden by the license³¹⁷ or to that their operation would not unduly restrain the legitimate exploitations of the works.³¹⁸

³¹³ For instance, a number of Open Content licenses allow for a non-commercial clause to be inserted into the terms and conditions, restraining the sphere of application of the license and thereby reducing the possibilities for users to make use of the licensed work. See e.g. the Creative Commons licenses BY-NC, BY-NC-ND, BY-NC-SA (<http://creativecommons.org/licenses/>)

³¹⁴ The possibility to create derivative works does not appear as an essential condition for certain Open Content licenses, which purport to deliberately prohibit the transformative use of a work for the purpose of maintaining the integrity thereof. See e.g. the Creative Commons licenses BY-ND and BY-NC-ND, which expressly stipulate that although any licensee has the right to make such modifications as are technically necessary to exercise the rights of reproduction in other media and formats, the right does not extend to the making of adaptations. (<http://creativecommons.org/licenses/>)

³¹⁵ Amongst the Open Content licenses which allow for the making of derivative works, certain licenses require the additional condition that any derivative work be licensed on the same terms and conditions under which the original work was released. See e.g. the GNU Free Documentation License (<http://www.gnu.org/licenses/fdl.html>); and the Creative Commons licenses BY-SA and BY-NC-SA (<http://creativecommons.org/licenses/>)

³¹⁶ DRM systems may have a role also for the management of rights for works released under Open Content licenses. For instance, watermarking technologies could be combined with digital signatures in order to guarantee the integrity and the authenticity of content or with detailed metadata in order to communicate the licensing terms to the user and to the device on which the content is being accessed. Technological measures could also be used to keep track of every act of exploitation that has been made of the work and communicate it to the corresponding right holders. More importantly, DRM systems could be capable of enforcing, or at least inducing compliance with the terms of most Open Content licenses, without unduly restraining the exploitation of the work. For instance, technological measures could ensure that attribution be given by e.g. incorporating the author's identity into the work by the means of robust watermarking technologies; they could prevent the making of derivative by e.g. applying a fragile watermark that would be destroyed with any modification of the work thereby providing a signal that infringement occurred; they can prevent the commercial exploitation of the work by e.g. applying a watermark with the user's identity and particular metadata that would communicate to any tracking technology browsing the Internet in search of potential infringing works that the work is being illegitimately exploited. See: FITZGERALD, B. & REID, J. (2005) Digital Rights Management (DRM): Managing Digital Rights for Open Access. IN ROONEY, D., HEARN, G. & NINAN, A. (Eds.) *Handbook on the Knowledge Economy*. Edward Elgar.

³¹⁷ A few Open Content licenses are incompatible with the application of any technological measures of protection designed to prevent and/or restrict the access to and/or the exploitation of a work, whether the restricted act is legitimate or not. See for instance the Anti-DRM license: "This license is incompatible with any technology, device or component that, in the normal course of its operation, is designed to prevent or restrict acts which are authorized or not authorized by licensor: this incompatibility causes the inapplicability of the license to the work." (http://www.freecreations.org/Against_DRM2.html). See also the GNU Free Documentation License: "You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute." (<http://www.gnu.org/licenses/fdl.html>)

³¹⁸ Certain Open Content licenses are incompatible with the application of technological measures of protections to the extent that they prevent and/or restrict the access to and/or the legitimate exploitation of a work. See e.g. article 4(1) of the Creative Commons licenses, according to which: "You may not distribute, publicly display, publicly perform, or publicly digitally perform the

PROBLEMS

Although the Open Content community has been flourishing in the last years, the long-term sustainability of Open Content licenses has yet to be confirmed and a need for greater legal certainty is progressively emerging.

To date, in fact, Open Content licenses have not actually been tested in court, with the exception of two cases in Spain, one in the Netherlands, and a limited number of lawsuits in the USA that did not however address the merits of the licenses as such.³¹⁹ As the Open Content community will eventually assume greater significance in society, however, the validity and enforceability of this particular licensing mechanism will likely be subject to a more severe legal scrutiny. A variety of new legal questions may therefore have to be addressed, the answers to which have yet to be established.

A. ENFORCEABILITY

The uncertainty concerning the legal status of Open Content licenses may affect the validity and the enforceability of their corresponding terms and conditions. As a legal instrument, an Open Content license can in fact be regarded either as a bare license – whose terms and conditions can be enforced only to the extent that they do not extend beyond the scope of the copyright regime,³²⁰ or as a contractual license – whose provisions can be enforced in accordance with the principles of contract law.³²¹

Work with any technological measures that control access or use of the Work in a manner inconsistent with the terms of this License Agreement.” (<http://www.creativecommons.org/licenses>). However, certain Open Content licenses also require that the right of users to perform a legitimate exploitation of the work be not restrained. See, e.g. article 2 of the Creative Commons licenses, stating that “Nothing in this license is intended to reduce, limit, or restrict any rights arising from fair use, first sale or other limitations on the exclusive rights of the copyright owner under copyright law or other applicable laws.” It is therefore arguable whether any technological measures designed to control access or use of the work could ever be consistent with the terms of the License, in view of the difficulties for a technological measure of protection to properly comply with the whole set of copyright exemptions and limitations. See SAMUELSON, P. (2003) DRM {and, or, vs.} the Law. *Communications of the ACM*, 46.

³¹⁹ See *SGAE v Jose Luis* (Audiencia Provincial de Pontevedra, Sentencia de 29 Nov. 2005, rec. 3008/2005) and *SGAE v Ricardo Andres Utrera Fernandez* (Juzgado de Primera Instancia de Badajoz, Procedimiento Ordinaria 761/2005, Sentencia N. 15/2006); *Curry v Audax* (District Court of Amsterdam, Case no. 334492 / KG 06-176 SR); *Chang v. Virgin Mobile* (2007), and *Gate House Media Inc. v That's Great News*, No. 10-50164 (N.D. Ill. Filed 6/30/2010).

³²⁰ For instance, the provisions of certain Open Content licenses which prohibit the commercial exploitation of a work may in certain situations not be enforced by the courts, because copyright law does not cover the purpose of the exploitation. See VÄLIMÄKI, M. & HIETANEN, H. (2004a) The Challenges of Creative Commons Licensing. *Computer Law Review*, 6.

³²¹ The qualification of an Open Content license as either a contractual agreement or as a bare license is an extremely important distinction which is however very difficult to determine and whose qualification may vary from one jurisdiction to another. See *supra*, Part I. Chapter 4: Private Regulation: Open Content. Section 2: Legal Status.

Any provision that extends beyond the scope of the copyright regime cannot be enforced under copyright law, but can only be enforced in accordance with the provisions of contract law.³²² The difference is that, while the provisions of the copyright regime can be enforced over the public at large, the provisions of a contractual agreement only affect the relationship that subsists between the licensor and the licensees and cannot therefore impinge upon the liberties of third parties.³²³ In order to ensure that every contractual provision can be enforced against any potential user of the work, many Open Content licenses therefore prohibit the sublicensing of rights but require instead that a new license be issued to every user of the work.³²⁴

This notwithstanding, in the case of derivative works based upon a substantial number of previous works - or in the case of large collaborative works where the identity of every single contributor cannot be easily established, enforcing the copyright in a work can be extremely complicated to the extent that it requires the identification of the different joint-owners or co-owners of the copyright in the work.³²⁵

Finally, certain licenses might not be enforced to the extent that they are incompatible with the provisions of copyright law. For instance, in many jurisdictions, allowing for the free dissemination of works with no proper attribution to be given, or allowing for a work to be exploited regardless of the impact upon the honor and the

³²² See e.g. the case of *Jacobsen v Katzer et al.* (Case 3:06-cv-01905-JSW, Northern District Court of California, 2006), where it was held that, as a contract, the copyright license had effectively been breached, but that the requirement to include the copyright notice in every copy of the software was only a contractual covenant, which is beyond the scope of the copyright regime. Injunctive relief because there unavailable because there was no copyright infringement.

³²³ According to the principle of privity, any contractual obligation can only be enforced against those parties who have previously agreed to the terms and condition of the contract. Consequently, although the copyright owner may introduce a number of restrictions on the possibility for the licensees to redistribute a work, the licensor has however no authority over the activity of sub-licensees and can thus only enforce the contract through the intermediary of that particular licensee who sublicensed the work. See e.g. MERGES, R. P. (1997) The End of Friction? Property Rights and Contract in the 'Newtonian' World of On-Line Commerce. *Berkeley Technology Law Journal*, 12.

³²⁴ See e.g. the Creative Commons licenses, whose article 4(a) stipulates that no licensee is allowed to sublicense any of the rights acquired in a work released under a Creative Commons license to anyone else; and article 8(a) which stipulates that every time a licensee redistributes a work released under a Creative Commons license, the new recipient will automatically be entitled to a license from the original licensor allowing for the work to be exploited under the same terms and conditions of the license that had been originally granted to the licensee from which the work has been obtained.

³²⁵ While the co-owners of the copyright in a work might only sue against the infringement of their particular share of the copyright, joint-owners may actually bring an action on their own behalf, even though the proper enforcement of the copyright in the work would generally require the cooperation of each and every joint-owner. Indeed, while every joint-owner may enforce the copyright in a collective work with no requirement that any other joint-owner be party to the action., as a general rule, the various joint-owners may only be entitled to recover compensation for the portion of damages they are entitled to, regardless of the amount of damages incurred by the other joint-owners who did not join the action. See e.g. article 8 of the German Urheberrechtsgesetz, according to which "each joint author shall be entitled to assert claims arising from infringements of the joint copyright", and similar provisions in article 6 of the Swedish Act on Copyright in Literary and Artistic Works, article 26 of the Dutch Copyright Act, article 7 of the Swiss Copyright Law, section 6 of the Finnish Copyright Act, etc.

reputation of the author is likely to be incompatible with the regime of moral rights which are often considered to be unalienable.³²⁶

B. REVOCABILITY

Whether or not the licensor is entitled to modify the terms and conditions under which a work has been released is of key importance for the credibility of Open Content licensing. The issue is directly related to the question of revocability.

As a general rule, although the licensor may decide that a work shall no longer be released under a particular license, this decision cannot impinge upon the rights of any previous licensee who has legitimately obtained a license. Unless the license can be revoked, any formerly issued license will in fact continue to be valid provided that no breach has occurred.³²⁷ Instead, a license is considered to be revocable if, after a work has been released to the public, the license can, subsequently, be unilaterally withdrawn by the licensor, thereby extinguishing the rights that have been granted to every licensee.

Whether it amounts to a contractual license or to a bare license, however, the revocability of different Open Content licenses is still subject to debate. In particular, while the revocability of a license is likely to vary from one jurisdiction to another, as a general rule, if it amounts to a contractual agreement, a copyright license cannot be unilaterally withdrawn if not in certain exceptional circumstances.³²⁸ Conversely, in the case of a

³²⁶ Most civil law countries implemented the regime of moral right of paternity with a series of inalienable rights which cannot be waived. See e.g. L. 121-1 of the French Code de la propriété intellectuelle, according to which: “The author shall enjoy the right to the respect for his name, his authorship and his work. This right shall be attached to his person. It shall be perpetual, inalienable, and imprescriptible” Likewise, in most of the common law countries which actually implemented a moral right regime (e.g. Canada), moral rights can be contractually waived, but cannot be alienated to third parties.

³²⁷ See e.g. article 7(b) of the Creative Commons licenses, according to which the “licensor reserves the right to release the Work under different license terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this License (or any other license that has been, or is required to be, granted under the terms of this License), and this License will continue in full force and effect unless terminated [by a breach].” Accordingly, as long as the license has not expired and that none of its provisions have been breached, the license is deemed to be valid and legally effective with regard to every work it has been applied to, and any change in the terms and conditions of the license will not have any effect on the copies that have already been released but will only affect the license for the new copies of the work. See VÄLIMÄKI, M. & HIETANEN, H. (2004a) The Challenges of Creative Commons Licensing. *Computer Law Review*, 6.

³²⁸ If all the element for a valid contract are present, a license can be regarded as a contractual between the licensor and the licensee according to which the licensor promise not to sue the licensee for infringement in exchange of a promise from the licensee. Accordingly, once the license has been accepted by the licensee, the license is governed by the provisions of contract law and can therefore no longer be revoked unless by mutual consent of the parties, although it may nevertheless be terminated as a result of a breach or by other operations of law (e.g. frustration, conflict with another body of law, undue influence, misrepresentation). Exception to the rule can be found e.g. in the USA, where authors are granted with an unalienable termination right (see Section 203 of the US Copyright Act), according to which the transfer and/or the licensing of the copyright in the work can be terminated after 35 years; and in certain civil law jurisdictions, where authors are granted with an unalienable right of revocation (see e.g. Article 42 of the German Urheberrechtsgesetz, Article L.121-4 of the French Code de la propriété intellectuelle, Article 142 of the Italian Legge sul diritto d’Autore), according to which the transfer and/or the licensing of the copyright in the work can be terminated if the

bare license, the licensor is generally entitled to revoke the license at any time, provided that reasonable notice has been given to every party concerned.³²⁹ Yet, if the license purports to be irrevocable, the revocation thereof may be proscribed on the grounds of promissory estoppels whenever it has already been acted upon.³³⁰

C. COPYRIGHT OWNERSHIP

Before a work can be licensed under an Open Content license, it is necessary to identify the owners of the copyright in the work. This might be difficult to achieve in the case of a work released under an Open Content license which encourages the making of derivatives works and which may involve the contributions of many different individuals who can be regarded as either the co-owners or the joint owners of the copyright in the work depending upon the jurisdiction and the type of contributions they made.³³¹ Their qualification as one or the other may have a significant impact upon the validity of the license and the enforceability of its terms and conditions. While the co-owners of the copyright in a work are only entitled to license their particular share of the copyright, joint owners can license the work as a whole but only after obtaining the consent of all the other

author no longer agrees to the exploitation of a work on the grounds that it does not reflect the conviction of the author anymore, subject to prior indemnification of the current holder of the right.

³²⁹ As opposed to a donation, which is generally irrevocable (except in some rare situations), an Open Content license distinguishes itself from e.g. a donation to the public domain by virtue of the contractual nature of the provisions. Accordingly, to the extent that it is not coupled with consideration, in common law, a bare license can theoretically be revoked at any time - although the licensor is required to notify the licensees within a reasonable period of time before actual revocation. More details in HILL, J. (2001) The Termination of Bare Licences. *The Cambridge Law Journal*, 60. See e.g. *Carson v. Dynegy*, 344 F.3d 446, 451 n5 (5th Cir. 2003), where it was held that, even though a nonexclusive license had implicitly been granted by Carson, the license was however revocable because unsupported by consideration. By requesting the employees to stop using the worksheet, Carson had given effective notice that the license had been revoked.

³³⁰ If the license declares to be irrevocable and the licensee can provide sufficient evidence that the revocation of the license would cause considerable detriment to his person or activity (e.g. as a result of the making of a derivative work that would end up being infringing if the license were to be withdrawn), the revocation of the license could theoretically be prevented according to the principle of promissory estoppels. For more details, see ROSEN, L. & EINSCHLAG, M. B. (2004) *Taxonomy of Licenses. Open Source Licensing, Software Freedom and Intellectual Property Law*. Prentice Hall.

³³¹ The copyright in a collective work may be owned in common by two or more persons. There is no uniform concept of ownership in common, because it ultimately depends on the principles of national property law. In particular, ownership in common may be understood as joint-ownership, where each owner has a right of ownership in the property as a whole, or as co-ownership, where each owner owns a share of the property. As a general rule, joint-ownership subsists whenever the contribution of each author amounts to an inseparable element of the work and cannot be distinguished from the other contributions (e.g. in most European jurisdictions) or whenever each author contributes to the work with the intention that their contributions be merged into inseparable or interdependent parts of a unitary whole (e.g. in United States). Joint-owners are granted with an undivided interest in the copyright, which they can dispose of without the consent of the others, although dealings in the work necessarily require the consent of all joint-owners. Co-ownership subsists when the contribution of each author is distinguishable from the whole and can be thus independently exploited as a separate work. Co-owners are granted with a fractional interest in the copyright, whose amount generally depends on the value of their contribution with regard to the value of the work as a whole. For a more precise analysis of the regime of joint-ownership and co-ownership in the copyright regimes of Europe see report of the IPR Helpdesk of the European Commission: Joint Ownership in Intellectual Property Rights.

joint owners.³³² The more contributors there are to a single work, the higher is the risk that the work be improperly released under an Open Content license. Besides, ensuring the legitimacy of every contribution made to a collective work is an extremely challenging task that is often poorly implemented, and that may often result in the production of infringing material.³³³

As a result, the legal status of a work that purports to have been licensed under an Open Content license is ultimately uncertain. The problem is critical because copyright law is based on a strict liability regime, which does not acknowledge any form of protection for those users who may be reproducing, using, or distributing a work in good faith. Neither knowledge nor intent is a requirement for an individual to be held liable of copyright infringement.³³⁴

In order to address this problem, certain insurance companies have recently developed particular insurance policies aimed at the Open Source community and specifically designed to help companies whose key business largely depends on the use and the development of Open Source software in bearing the costs and the risks of copyright infringement.³³⁵ Whether or not a similar scheme will be developed for the Open Content community is still to be established.

³³² Given that that they all own an indivisible interest in the work, in the USA, non-exclusive licenses can be independently granted by every joint-owner, although they may not grant an exclusive license without the consent of the other joint-owners. In many countries of Europe (e.g. France, Germany, Spain, Italy, Belgium, Switzerland, The Netherlands, Sweden, Finland), joint-owners can exercise their rights over the work as a whole, but can only license the exercise of these rights with the consent of all, or at least a majority of the other joint-owners - although a number of jurisdictions provide that one joint-owner may not refuse the licensing of the copyright in the work without any reasonable motives (see e.g. article 8 of the German Urheberrechtsgesetz). For more details on the various conflicting in the different regimes of ownership in common, see GABRIEL, G. (2007) International Distributions: Divergence of Co-Ownership Laws. *Vanderbilt Journal of Entertainment and Technology Law*, 9.

³³³ In large projects for the making of a collaborative works, it may be extremely difficult to keep track of the origin of every contribution. Serious complications may therefore arise whenever people contribute to the work by incorporating material to which they do not own the copyright. As a result of an infringing contribution, in fact, the final work will necessarily amount to an infringing work, and so will any other work that has been derived from it. See, in particular, the case of *SCO v. IBM* (District Court of Utah, 2005, Case No. 2:03CV294 DAK), where SCO claimed that IBM had contributed to the Linux operating system with code from the Unix operating system whose copyright was owned by SCO, thus denying the applicability of the GPL license on the specific pieces of code that were owned by SCO on the grounds that that the license had been illegitimately granted without the authorization of the actual copyright owner.

³³⁴ The strict liability regime of copyright law may affect anyone who comes into possession of a work released under an Open Content license, regardless of whether or not the user is aware that the work may be infringing. In fact, it does not help for the user to be acting in good faith and to only be using the work in accordance with the terms and conditions of the license, since copyright infringement is a strict liability crime which does not require actual intent to infringe the copyright in a work, although the knowledge of the parties may have an impact on the amount of damages to be paid. Accordingly, the burden is on end-users to ensure that the whole work has actually and legitimately been released under an Open Content license. See VÄLIMÄKI, M. & HIETANEN, H. (2004b) Challenges of Open Content Licensing in Europe. Helsinki Institute for Information Technology.

³³⁵ See e.g. the Open Source Risk Management (OSRM), the first insurance policy designed to reduce the uncertainty related to the use and the exploitation of Open Source software, by providing financial coverage for the risks the most commonly faced by those companies which include and/or rely upon elements of Linux and other Open Source software in their commercial products or IT infrastructures, at <http://www.osriskmanagement.com/insurance.html>

D. LEGAL INTEROPERABILITY

In the Open Content community, there are nowadays a large number of licenses for users to select from. There is however a risk that the recent proliferation of licenses may actually jeopardize the goal of the Open Content community by reducing the legal interoperability of content released under different licensing schemes.

In line with the copyleft ideology,³³⁶ certain licenses require that the making of derivative works is allowed only to the extent that the resulting works are released under the same terms and conditions as the original work.³³⁷ Yet, the incorporation of a copyleft clause into an Open Content license can actually make the license incompatible with a series of other Open Content licenses, which, albeit similar, do not necessarily incorporate an identical set of provisions.³³⁸ Such a situation is likely to severely affect the activities of artists who specialize in transformative activities and might eventually disrupt the production of works that involve the combination of many different pieces of content.³³⁹

³³⁶ Copyleft (as opposed to copyright) refers to the practice of using copyright law to eliminate some of the restrictions imposed by the copyright regime by default (such as the prohibition to reproduce, distribute or adapt a work without the consent of the copyright owner) and ensuring that any modified or extended version of the work be equally free, by requiring that a derivative work inherit the license of the original work. See: What is Copyleft?; <http://www.gnu.org/copyleft/>, accessed on September 2007.

³³⁷ See e.g. the GNU Free Documentation License (<http://www.gnu.org/licenses/fdl.html>); the Creative Commons licenses BY-SA and BY-NC-SA (<http://creativecommons.org/licenses/>); the AShareNet-Share and Return (<http://www.aesharenet.com.au>); the Free Art license (<http://artlibre.org/licence/lal/en>); the Design Science License (<http://www.gnu.org/licenses/dsl.html>); the Open Publication License (<http://opencontent.org/openpub>); etc.

³³⁸ For instance, although the GNU General Public License (GPL) and GNU Free Documentation License (GFDL) have been intended to act as complementary licenses for the licensing of computer software and the documentation thereof, they are nevertheless incompatible with each other, since while the former requires that the whole work be freely modifiable, the latter provides that certain parts of the work may not be modified. Consequently, dual-licensing of both the code and the documentation is required in order to incorporate documentation into the source code of computer software and/or to incorporate code samples into the documentation thereof. Similarly, in spite of their similarities, the Creative Commons Attribution + Share-Alike license (CC-by-sa) is incompatible with both the GPL and the GFDL, because every license requires that any derivative work be licensed under exactly the same license (or family of licenses) as the original. For a broader overview of the difference between various Open Source and Open Content licenses and their respective compatibility, see the comprehensive review of licenses made by the Free Software Foundation available at <http://www.gnu.org/philosophy/license-list.html>. Note however that ever since version 3.0 of the Creative Commons Attribution + Share-Alike license (CC-by-a), a new provision has been inserted in article 4(b), according to which the licensee “may Distribute or Publicly Perform an Adaptation [also] under the terms of (iv) a Creative Commons Compatible License” listed at <http://creativecommons.org/compatiblelicenses>. To date, however, Creative Commons has not approved any licenses for compatibility.

³³⁹ See e.g. the various challenges faced by Wikipedia which requires all the content to be released under the GNU Free Documentation License, although it is likely to preclude a large number of Open Content from being published on Wikipedia for the purposes of compatibility, and vice versa, to prevent the content of Wikipedia from being published in any other platform which endorses a different model of licensing. For more details, see BLACK, P., DELANEY, H. & FITZGERALD, B. (2005) Legal Issues for Wikis: The Challenge of User-generated and Peer-produced Knowledge, Content and Culture. *International Symposium on Wikis*. Australia. The incompatibility between the GFDL and the Creative Commons licenses has eventually led the Free Software Foundation to update the GFDL (GFDL version 1.3) in order to enable the migration of content towards the Creative Commons license CC-BY-SA (Attribution – Share Alike) from the 1st of November 2008 until the 1st of August 2009. The amendment was

Accordingly, although it may ensure that future generations maintain full access to a growing variety of works, there are certain circumstances in which a copyleft clause may actually hinder rather than safeguard the capacity for future generations to engage in the production of derivative works.³⁴⁰ The lack of legal interoperability amongst different Open Content licenses is therefore likely to evolve into a key concern which may considerably limit the opportunities for authors to avail themselves of the contributions of other authors for the production of new works.³⁴¹

E. JURISDICTIONAL CONCERNS

In spite of the extensive process of harmonization that has been undertaken, substantial differences subsist amongst the national implementations of the copyright regime. The vast majority of Open Content licenses have therefore been designed with one legal system in mind and their provisions have been tailored to the distinctive features thereof. Yet, given that the copyright is a national right,³⁴² the validity of a copyright license ultimately depends upon the provisions of the applicable national law. It is always possible that a license which has been conceived for a particular jurisdiction be considered invalid or unenforceable in another jurisdiction.³⁴³

made for the sole purpose of allowing Wikipedia and other initiatives in the same situation to shift away from the GFDL by relicensing or dual-licensing the content into the appropriate Creative Commons license in order to achieve a greater level of interoperability. See the GFDL license v.1.3 clause 11, which allows for content which had previously been released under the GFDL to be relicensed under the Creative Commons license CC By-SA 3.0 subject to a very specific set of conditions.

³⁴⁰ The viral effect of any given copyleft clause is likely to bring considerable advantages to the creative community by ensuring that the content released under any Open Content license incorporating a copyleft clause will remain forever available for exploitation by future generations. However, the incorporation of a copyleft clause into a copyright license may also to a certain extent undermine the capacity of future generations to combine different works together, since the terms and conditions of the license becomes permanently attached not only to the content of the work they have been originally applied to, but also to every derivative work that will be made of that work and/or any subsequent work that directly or indirectly derives from that content. With regard to incompatibility problems related to Open Source licensing, see e.g. SILVA, A. C. & MASBERNAT, P. (2004) *Licensing of Free Software and Open Source*. University of Chile.

³⁴¹ Incompatibilities between different Open Content licenses resulting from conflicting share-alike constraints may considerably restrain the future production of creative works by limiting the possibility for authors to create new works based upon a variety of different works, since the number of works from which to choose from will be drastically reduced as a result of the potential liability arising from the use of works released under incompatible terms and conditions. For more details, see KATZ, Z. (2006) *Pitfalls of Open Licensing: An Analysis of Creative Commons Licensing*. *IDEA*, 46.

³⁴² As the copyright regime is regulated on a strictly national basis, the copyright in a work merely constitutes a territorial right which may only be enforced within the national territory in which the right has been granted. Although the work may be eligible for copyright protection within different jurisdictions, the requirements and limitations of the copyright regime are not necessarily the same from one country to another. Copyright owners may only enjoy country specific rights and the protection they are granted with is ultimately based on the law of the country in which protection is sought. See GOLDSTEIN, P. (2001) *International Copyright: Principles, Law, and Practice*, Oxford University Press.

³⁴³ Just like copyright law, the rules and principles of contract law are deeply rooted within the national laws of national jurisdictions. The discordances between the provisions of different jurisdictions may thus pose a significant number of challenges for both the

In order to ensure their universal validity and worldwide enforceability, the provisions of certain Open Content licenses have therefore been translated and adapted to better comply with the specificities of domestic laws.³⁴⁴ While this is likely to ensure their validity and the enforceability within a larger range of jurisdictions, the process of adapting a license to national jurisdictions has the severe drawback of actually increasing the level of discrepancies that subsist between the nationalized versions of the license.³⁴⁵ This may ultimately jeopardize the validity and the enforceability of these licenses, whenever they are employed into the legal system of a country other than that for which they have been specifically designed.³⁴⁶

licensors and the licensees in establishing the validity and the enforceability of a particular license according to the provisions of the corresponding national legislation. For more details, see NIMMER, R. T. (1995) Licensing on the Global Information Infrastructure: Disharmony in Cyberspace. *Northwestern Journal of International Law & Business*, 16.

³⁴⁴ See e.g. the Creative Commons International (CCi) project, whose main objective is to port the Creative Commons licenses in order to adapt them to the local jurisdictions of different countries, not only by linguistically translating the licenses but also by legally adapting them to every particular legal system. More information available at <http://creativecommons.org/international/>

³⁴⁵ For instance, in the context of the Creative Commons, the licenses of certain jurisdictions expressly stipulate that the licenses should be regarded as a contract (e.g. France, Spain, Holland), while others do not mention anything with regard to the legal status of the licenses. Certain national adaptations have been required to use very different terminology (e.g. distribution vs. making available to the public) in order to ensure compliance with the national copyright laws. The different regimes of exemptions (e.g. general principles of fair dealing in most common law jurisdictions vs. closed lists of limitations in the jurisdictions of most civil law countries) and the regime of moral rights (very strong in the law of most civil law countries but less significant in many common law jurisdictions) also had to be taken into account in the process of adapting the licenses to the various national copyright regimes. For more details concerning the inconsistencies introduced into the national adaptations of the Creative Commons licenses, see VÄLIMÄKI, M. & HIETANEN, H. (2004a) The Challenges of Creative Commons Licensing. *Computer Law Review*, 6.

³⁴⁶ According to the principles of *lex contractus*, if a work has been released under a particular license which has been adapted to the national legislation of a specific jurisdiction, the validity and the enforceability of the license will be subject to the laws of the country believed to be the most closely connected with the contract, which is likely to be the national jurisdiction for which the license has been intended. However, in the context of an action for copyright infringement, the *lex loci protectionis* principle will prevail and the license will therefore be assessed against the copyright regime of the country in which protection is sought. This can be rather problematic insofar as the provisions of the licenses are likely to be to some extent incompatible and/or inconsistent with the provisions of the national copyright regime of the particular jurisdiction in which protection has been sought. For more details on the jurisdictional problems of the Creative Commons licenses, see HIETANEN, H. (2007) A License or a Contract: Analyzing the Nature of Creative Commons Licenses. Helsinki Institute for Information Technology.

PUBLIC POLICY: LIMITS TO PRIVATE REGULATION

The advent of the Internet and digital technologies has drastically modified the way in which copyright works are traded in the market for information goods. In the digital environment, a series of new mechanisms have become available for the private sector to complement, rearrange or to completely bypass certain provisions of the copyright regime. Private ordering cannot however - by itself - regulate the access to and the usage of copyright works without any limits or constraints. In order for any private mechanism of self-help to simultaneously foster the interests of right holders, end-users, and the society at large, private regulation and public regulation necessarily have to operate in conformity with each other.

The general belief of the laissez-faire ideology is that once a proper set of property rights has been set up by the State, a network of contractual relationship between private actors may substitute for any external form of regulation. In particular, the digital environment could be regarded as a separate jurisdiction, whose governance could ultimately be determined by self-regulation. Instead of relying on the public regulation of a sovereign State, the cyberspace could be governed by way of private ordering and market interactions.³⁴⁷ As long as the State could provide a background for property and contract law, contractual relationships and coordination mechanisms could, in fact, constitute the main basis of regulation on the Internet.³⁴⁸

Yet, the legal regimes of property and contract law should nonetheless be regulated by a sovereign authority for the purposes of either limiting or enforcing norms introduced by private ordering. Indeed, while the notion of sovereignty may have to be revised in the digital environment, the cyberspace should not be left into a state of anarchy. In order to allow for a self-regulating environment to develop, private regulation should ultimately be subject to the scrutiny of the State.³⁴⁹

³⁴⁷ As a separate jurisdiction, the cyberspace can develop its own mechanisms of governance and regulation. In particular, in the digital environment, governance could be based on customary norms that emerges independently and evolve together with the development of the cyberspace. In fact, given that private ordering is assuming a predominant role in the regulation of the Internet network, public regulation may become increasingly less relevant in the digital world up to the point in which it would be completely replaced by private ordering and self-regulation. For a more detailed analysis of private regulation in the digital environment, see in particular JOHNSON, D. R. & POST, D. G. (1997) *And How Shall the Net be Governed? A Meditation on the Relative Virtues of Decentralized, Emergent Law*. IN KAHIN, B. & KELLER, J. H. (Eds.) *Coordinating the Internet*.

³⁴⁸ See e.g. the case of ICANN (Internet Corporation for Assigned Names and Numbers), which is universally recognized as the sovereign authority responsible for managing the assignment of domain names and IP addresses; and the case of NSI (Network Solutions Inc.), a private body which has been universally accepted as the sovereign authority for the registrations of domain names on the Internet until 1999.

³⁴⁹ There exist no autonomous regimes of property or contract law. The viability of private ordering presupposes the intervention of a sovereign entity with the function of establishing a legal framework regulating the use of property rights and contracts, and with the role enforcing private norms and regulations in accordance with the principles of public policy. This is even more important in the

In particular, governmental intervention is often regarded as necessary not only for the creation of a clearly defined set of property rights, but also for the enforcement thereof.³⁵⁰ While the establishment of proprietary rights in particular types of resources is a critical requirement for the institution of a market, it does not however constitute a sufficient condition for the proper functioning of the market. Therefore, to facilitate the transfer of property rights to the parties that value them the most, the establishment of strong and secure property rights must be combined with the definition of a specific set of contractual rules. Fundamentally, the institution of the contract is instrumental to the exchanges of property rights. Although the State may have no role to play in regulating the use or transfer of private property, it may nonetheless have a function in the enforcement of decisions made by private actors. In fact, outside of small and homogenous groups where deviance from the norms is either difficult or apparent, it is sometimes difficult to implement proper enforcement mechanisms through self-regulation.³⁵¹ Even from a laissez-faire perspective, therefore, the government is generally responsible for the enforcement of contractual agreements between private parties.³⁵² As a result of technological advances, however, enforcement may no longer require the intervention of any regulatory authority given that technological measures of protection may actually constitute an adequate mechanism of enforcement.

Contractual negotiations can be costly and excessive transaction costs may eventually preclude the conclusion of mutually beneficial agreements. Accordingly, with reference to the most common types of transactions, many legal systems have identified a series of default rules which are automatically incorporated into any contractual agreement unless they have been overridden by explicit contractual provisions. The introduction of a particular set of default terms is particularly valuable to the extent that it decrease the amount of transaction costs involved in a standard round of negotiations, while simultaneously reducing the level of uncertainty resulting from the conclusion of incomplete contracts. In order to be effective, however, default terms should

case of the Internet, which, as a result of its global and integrated structure, necessarily has to be regulated as it would otherwise develop into a state of anarchy. See RADIN, M. J. & WAGNER, R. P. (1998) *The Myth of Private Ordering: Rediscovering Legal Realism in Cyberspace*. *Chicago-Kent Law Review*, 73.

³⁵⁰ The trading and the exchange of private property rights constitute of the main driving forces of economic growth. The State must therefore define a series of property rights which can be traded amongst private parties. Yet, to the extent that the security of property rights does not occur naturally, the State must therefore play an active role in order to establish a particular legal system designed to regulate the use and to enforce the exchange of these rights in accordance with public policies and social order. See LEVINE, R. (2005) *Law, Endowments and Property Rights*. *The Journal of Economic Perspectives*, 9, 61-88.

³⁵¹ Coordination in a self-regulated environment can only be achieved through the cooperation of all members of the group. Accordingly, the smaller the group is and the more culturally homogenous its members are, the easier will it be to achieve stability. Yet, stable coordination also requires the development of mechanisms capable of enforcing the norms of the organization in order to avoid the progressive degeneration thereof as a result of free-riding. Whether or not this can be achieved by internal mechanisms without the support of any external authorities is once again a matter of contingent circumstances. For more details, see RADIN, M. J. & WAGNER, R. P. (1998) *The Myth of Private Ordering: Rediscovering Legal Realism in Cyberspace*. *Chicago-Kent Law Review*, 73.

³⁵² The fundamental function of contract law is to facilitating the transfer of property rights amongst the members of society. Indeed, a predefined set of clear and enforceable contractual rules is a prerequisite for the trading and the achievement of mutually beneficial exchanges of proprietary assets, which ultimately allows for specialization, innovation and economic growth. See EPSTEIN, R. A. (1996) *Contracts Small and Contract Large: Contract Law Through the Lens of Laissez-Faire*. University of Chicago Law School.

be designed to reflect the common will of the parties, so that only those willing to differ from the established standard may have to incur additional transactions costs.³⁵³

In line with the principle of freedom of contract, according to which anyone may enter into an agreement on private terms in order to pursue individual interests, many legal provisions could be regarded as a default rule which could theoretically be contracted around.³⁵⁴ By analogy with copyright law, the copyright regime basically provide a series of default rights and obligations intended to facilitate the commerce of creative works by reducing the level of transactions costs that would have been otherwise required for any contracting party to enter into an agreement concerning the manner in which every copy of the work can be legitimately exploited. In many cases, however, it may actually be in the interest of right holders and/or end-users to partially deviate from the default rules provided by the law.³⁵⁵

According to the laissez-faire ideology, copyright owners should be allowed to use contractual agreements and technological measures of protection in order to regulate the manner in which digital works can be legitimately exploited. Deviation from the default rule may, however, take different forms. For instance, while certain right holders would rather have their works freely reproduced and disseminated over the Internet network, others may rather avail themselves of a series of contractual mechanisms and technological measures of protection in order to control the exploitation of their works up to the smallest level of details. As opposed to the inherent rigidity of property law, the increased flexibility of contract law is likely to allow content

³⁵³ Default rules should generally be based on what is considered reasonable and customary in the particular field of application. In particular, six different types of default rules can be identified: (1) problem-solving defaults, which provide a satisfactory solution to a particular contracting problem; (2) equilibrium-inducing defaults, which are intended to induce parties to adopt a welfare-maximizing term; (3) information-forcing defaults, which attempt to reduce information asymmetries between parties; (4) normative defaults, which try to favor a particular contractual terms on the grounds of fairness; (5) transformative defaults, which may actually transform the parties preferences in order to induce them to select a particular term that is considered more fair; and (6) structural defaults, which fundamentally define the nature of the contractual relationship. For a more detailed overview of default rules in contract law, see e.g. SCHWARTZ, A. (1993) The Default Rule Paradigm and the Limits of Contract Law. *Southern California Interdisciplinary Law Journal*, 3.

³⁵⁴ The law can sometimes regarded as a set of default rules provided for the convenience of private actors. Under this view, contractual agreements may sometimes introduce considerable changes to the standard legal rules, at least to the extent that they apply to that particular contractual relationship. This is the case, for instance, of many provisions of contract law, which have for the most part been designed in order provide a series of default terms to be applied whenever the contracting parties did not expressly agree on something. The idea, therefore, is that private ordering should be able to either modify or override the law whenever it is in the interest of contracting parties to do so, thereby allowing for any legal provision to be superseded by private regulation. The State, however, retains ultimate authority to decide whether or not legal rules emerging from private regulation should be enforced in the same way as those deriving directly from public regulation. For more details, see LEMLEY, M. (1999) The Law and Economics of Internet Norms. *Law & Economics Working Paper Series*. University of California, Berkley.

³⁵⁵ Legal rules may either qualify as default rules which can be waived and/or overridden by contractual means, or as immutable rules which cannot be contracted out. Accordingly, to the extent that copyright law is regarded as a series of default rules, every provision of the copyright regime could essentially be overridden by way of contractual agreements between private parties. Whether it is sensible to regard copyright law as consisting merely of default rules is however open to debate. See, in particular, RADIN, M. J. (2004a) Regime Change in Intellectual Property: Superseding the Law of the State with the "Law" of the Firm. *The University of Ottawa Law and Technology Journal*, 1.

providers to engage into an extensive form of price discrimination which may ultimately benefit both copyright owners and consumers.³⁵⁶

Yet, in contrast with the principle of freedom of contract, a number of contracts may be invalidated on the grounds of public policy. As a general rule, government intervention may be justified in any situation characterized by (1) positive or negative externalities and (2) significant asymmetries of information. Compulsory terms may also be required on the grounds of (3) distributive justice or for the purpose of endorsing the respect of public order or morality. Finally, (4) paternalism may sometimes be regarded as a legitimate ground for government intervention.³⁵⁷

With reference to copyright law, to the extent that they may destabilize the traditional equilibrium of the copyright regime, the State may sometimes be required to intervene in order to impose a number of constitutional safeguards and limitations on certain contractual agreements. To begin with, information asymmetries are likely to affect the overall level of competition in the market for information goods, by creating an imbalance of power between right holders and end-users in the context of contractual negotiations. In addition, despite these asymmetries, contractual negotiations are unlikely to result in a socially optimal outcome because of certain positive and negative externalities which are unlikely to be accounted for by the contracting parties. Finally, government intervention may be required in order to ensure a maximization of social welfare. In this case, limits to contractual freedom are justified in order to ensure that the regulation of information in the digital environment is likely to produce a situation that will ultimately serve the public good of society even if it is fundamentally governed by the private sector.

³⁵⁶ The manner and the extent to which digital works may or may not be exploited in the digital environment could ultimately be regulated by a contractual regime based on private ordering, insofar as copyright owners are entitled to replace the rights they have been granted with under copyright law with a more customized set of rights based on contractual agreements. To the extent that contract law is much more flexible than copyright law, this shift towards private regulation may even be beneficial to society in that it would allow for a more intensive strategy of price discrimination to be implemented, resulting into an increased production of works as a consequence of the greater economic rewards for content producers. Yet, in order to maintain the proper balance of copyright law, certain provisions of the copyright regime should be regarded as mandatory rather than default rules. For more details, see FISHER, W. W. (1998) Property and Contract on the Internet. *Chicago-Kent Law Review*, 73, 1203-1211.

³⁵⁷ Contractual freedom can be fundamentally be limited on six different grounds: (1) bad information which would necessarily lead to the conclusion of a transaction that is not mutually beneficial to the contracting parties; (2) externalities which, if not properly taken into account by the contracting parties, are likely to cause prejudice to the interests of third parties; (3) arguments from future selves which may otherwise not be accounted for; (4) distributive justice intended to transfer wealth from the richest to the poorest; (5) public policy arguments for the endorsement of a decent and just society; and finally (6) paternalism justifications aimed at protecting the interest of the parties involved in the transaction. For a more detailed overview, see *Ibid*.

INFORMATION ASYMMETRIES

According to economic theories, information asymmetries occur whenever the suppliers can avail themselves of more and/or better information than what is available to end-users. Asymmetry of information represents a standard situation in many markets that operate with complex products - where the supplier is generally in a better position to know the actual value of the goods that are being traded and may deliberately prevent end-users from acquiring that information.

Contractual negotiations should theoretically establish a situation where the interests of all contracting parties are evenly taken into account. Private ordering may however not necessarily result in a socially optimal outcome to the extent that, as a result of information asymmetries and disparities of power, all parties may not have equal opportunities to participate in contractual negotiations.³⁵⁸ This is likely to lead to market failure whenever the asymmetries are so significant as to actually distort the outcomes of the market.³⁵⁹

In this respect, the commerce of copyright works has always been associated with a certain degree of information asymmetry. Indeed, because of its very nature as an experience good,³⁶⁰ the actual value of a work for any given user can only be determined after a particular copy of the work has been purchased.

In the digital environment, the problem of information asymmetries has been further intensified as a result of the possibility for content providers to restrict the access and usage of a work by contractual and/or technological means. Given that end-users are not always given proper notice of the whole set of restrictions

³⁵⁸ Private agreements concluded in a competitive market will generally lead to an increase in social welfare. Competitive pressures will in fact lead to the adoption of terms and conditions which are mutually beneficial to all parties involved. However, the presence of market failures, such as market power or information asymmetries may lead to the conclusion of contractual agreements which do not actually constitute an optimal outcome for all parties to the agreement. In particular, in the context of most copyright end-user licensing agreements, it is often the case that there are information asymmetries between suppliers and consumers. The inability of consumers to distinguish between advantageous and disadvantageous terms is thus likely to result in the adoption of the most unfavorable terms for the consumer. For more details, see e.g. LINDSAY, D. (2002) *The law and economics of copyright, contract and mass market licenses*, Australia, Centre for Copyright Studies.

³⁵⁹ Market failure subsists whenever, as a result of its distinctive characteristics, the market is unable to reach the most efficient outcome. In the context of copyright works, the market for information goods is likely to fail whenever important asymmetries can be observed with regard to the information available to content providers and end-users. Given that they can avail themselves of supplementary information, content providers are in a better position than end-user in the course of contractual negotiations, the outcome of which is therefore likely to be more favorable to them. For more details, see e.g. LINDSAY, D. (2003) *Economic Perspectives on Copyright Law*. Centre for Copyright Studies.

³⁶⁰ In economics, experience goods are products whose value and characteristics are difficult to determine in advance because they can only be ascertained upon consumption. As such, it is difficult for consumers to make an accurate choice concerning the acquisition of these goods. For more details on the problems related to the trading of experience goods, see e.g. SHAPIRO, C. (1983) *Optimal Pricing of Experience Goods*. *Bell Journal of Economics*, 14, 497-507.

associated to a particular copy of the work, it is not uncommon, in the digital environment, for users to purchase a work without being fully aware of the various limitations they may subsequently encounter.³⁶¹

Regulatory action may therefore be necessary in order to address the problem associated with the lack of transparency concerning the extent of restrictions included within certain copyright licenses combined with technological measures of protection.

In particular, severe information asymmetries can be observed in the context of digital works released under particular licensing agreements which assume the form of contracts of adhesion. In the digital world, the majority of end-user licensing agreements (such as e.g. shrink-wrap licenses, click-wrap licenses, etc) basically consist of a series of non-negotiable terms and conditions which can either be accepted or refused altogether.

The danger is that private ordering may exercise coercion by inserting a series of unfair terms and conditions into certain end-users licensing agreements, whose contractual clauses do not result from competitive market interactions but rather from a situation of market power or collusion.³⁶² If contracts of adhesion were to become a staple of private regulation in the digital environment, every user willing to consume a work would ultimately be compelled to enter into a contractual agreement they do not necessarily agree with.

In order to ensure an optimal level of production and the widespread dissemination of creative works, it may therefore be necessary to regard certain provisions of the copyright regime as a series of compulsory terms which cannot be waived nor altered.

Accordingly, while the principle of freedom of contract should generally be respected in order to allow for the market to operate undisturbed, the State should nonetheless be entitled to intervene in order to ensure, on the one hand, that certain provisions of the copyright regime can always be enforced – regardless of what the copyright license says, and, on the other hand, that any ‘unfair’ or ‘unreasonable’ term and condition incorporated into a copyright license cannot be enforced whenever the license qualifies as contract of adhesion.

³⁶¹ Contractual restrictions and technological measures of protection often prevent the standard exploitation of a work beyond what is generally to be expected by end-users. Restrictive licenses can prevent users even from engaging into non-infringing uses, such as time-shifting or device-shifting. Standard users’ expectations are therefore likely to be frustrated whenever the exploitation of a work is restricted by contractual and/or technological means, but no proper notice has been given to end-users. This lack of transparency is very common in the digital environment, where content providers do not have an interest in providing adequate and effective notice of the various restrictions associated with the digital copies of a work. SAMUELSON, P. & SCHULTZ, J. (2007) Regulating Digital Rights Management Technologies: Should Copyright Owners Have to Give Notice about DRM Restrictions? *Journal of Telecommunications and Technology Law*.

³⁶² As such, contracts of adhesion are not problematic to the extent that competitive forces will eventually induce the adoption of reasonable terms and conditions. However, insofar as it is possible for the market players to collude in order to achieve a situation of oligopoly characterized with market power, the access to and the consumption of certain digital works may only be possible after entering into a contract of adhesion with a standardized set of terms and conditions which are offered on a take-it-or-leave-it basis. Accordingly, the network of contractual relationship, although theoretically consensual, could ultimately be considered tantamount to a strict and rigid structure of entitlements. For more details, see RADIN, M. J. & WAGNER, R. P. (1998) The Myth of Private Ordering: Rediscovering Legal Realism in Cyberspace. *Chicago-Kent Law Review*, 73.

EXTERNALITIES

Contract theory is a section of economics which analyzes the way in which economic agents behave in the course of contractual negotiations. According to this theory, if the interests of every party involved in a contractual relationship were to be equally taken into account, and provided that the individual preferences of each party were to be perfectly communicated, private ordering would ensure that the best possible outcome is achieved for all parties involved in the contractual negotiation.³⁶³

Yet, regulating the exploitation of copyright works through private ordering alone may not necessarily result into a socially optimal outcome insofar as it may give rise to a series of positive and negative externalities which are unlikely to be fully internalized by the contracting parties.³⁶⁴

The problem with externalities is that they are likely to lead to market failure whenever they are not properly accounted for. Indeed, according to the rationality assumption in economics, the behavior of individuals can normally be regarded as a means to maximize their individual interests and preferences. In the course of any contractual negotiation, private parties will therefore only be concerned with the maximization of their individual utility – as opposed to the overall utility for society. As such, they are unlikely to account for many of the externalities (positive or negative) that may ensue from the agreements they have entered into.³⁶⁵

With regard to copyright works, the production and the consumption of information is likely to produce a series of positive externalities on society because every individual can benefit from a broader access to information. Yet, the market is generally unable to understand the positive externalities deriving from the consumption of information goods. This is likely to produce a situation characterized by an under-production of information, because authors are likely to produce new works only up to the point that maximizes their personal returns, without accounting for the fact that their works may also bring some benefits to society at large.³⁶⁶

³⁶³ According to the laissez-faire ideology, while the market will eventually lead to a Pareto-optimal outcome, there are no objective criteria to determine whether one alternative is better than the other, except from the process by which the outcome has been reached. Proper regulation on the Internet can therefore be achieved only if the rules and norms regulating the use of information are determined by the users themselves (e.g. by way of a collective decision-making process) rather than by an external authority representing the interests of the whole community of Internet users (e.g. the State). See, in particular, JOHNSON, D. R. & POST, D. G. (1997) *And How Shall the Net be Governed? A Meditation on the Relative Virtues of Decentralized, Emergent Law*. IN KAHIN, B. & KELLER, J. H. (Eds.) *Coordinating the Internet*.

³⁶⁴ In economics, externalities are defined as the consequences of a particular activity which are experienced exclusively by third parties. They can be either positive or negative according to whether they are beneficial or harmful to third parties.

³⁶⁵ For a more detailed overview of the concept of rationality in economic theories, see e.g. NORTH, D. C. (1993) *What do we mean by rationality?* *Public Choice*, 77, 159-162.

³⁶⁶ One problem concerning the regulation of information goods exclusively by private means relates to the positive externalities generated by creative works not being taken into account by authors and publisher when deciding upon the optimal amount of works to produce. The most significant of which are the enrichment of the pool of common cultural heritage, the achievement of greater

In addition, any restriction on the way in which information can be accessed and/or exploited would ultimately generate a cost on society³⁶⁷ - which would however have a positive impact upon the interests of right holders. Hence, if the regulation of information were to be left exclusively to the invisible hands of the market, it would lead to a situation characterized by an under-exploitation of information, given that right holders are likely to release their works under restrictive terms and conditions and for a price that maximize their economic returns, without accounting for the negative consequences that may have over the interests of authors, end-users and society at large.³⁶⁸

Regulatory action is therefore required, on the one hand, in order to provide more incentives for authors to create – a function that is currently being fulfilled by copyright law, and, on the other hand, in order to prevent copyright owners from introducing an excessive level of restrictions over the access and the consumption of their works.

SECTION 3

PUBLIC INTEREST

While copyright law provides authors with a series of exclusive rights over the exploitation of their works, it is ultimately aimed at increasing the number of works that will eventually be made available to the public. Yet, by means of specific technological measures and contractual agreements, copyright owners may regulate the use of information beyond the default scope of protection granted by the copyright regime – in a direction that might sometimes run counter to the public interest of society.

One critical concern with the private regulation of information goods is, in particular, related to the preservation of the public domain as a common resource of works which are freely available to every member

education through the dissemination of culture and information, the development of critical judgment and discriminatory abilities by individuals subject to a culturally rich and diverse environment, and the ultimate qualitative enhancement of the public debate indispensable for the viability of a democratic society. FISHER, W. W. (1988) Reconstructing the Fair Use Doctrine. *Harvard Law Review*, 101.

³⁶⁷ To the extent that they are not fully internalized, the contracting parties are not directly affected by these externalities and will therefore be likely to agree upon a higher level of restrictions than what would be socially desirable. See e.g. BENKLER, Y. (2000) An Unhurried View of Private Ordering in Information Transactions. *Vanderbilt Law Review*, 2063.

³⁶⁸ While the monopoly returns provided by the copyright regime are an effective instrument to encourage the production of the creative works that the public want the most, the proprietary regime also raises the costs of the inputs necessary to produce a new copyright work above their marginal costs, thereby generating a net welfare loss. Moreover, according to economic theories, selling products at their marginal costs is a necessary condition for an efficient allocation of resources. However, in a situation of monopoly there is an incentive to sell products at higher prices than their marginal costs of production. Accordingly, consumers will either have to pay the additional charge, or they will have to purchase another less satisfactory product. In the latter case, the loss for the consumers is not balanced by any gain for the monopolist and is therefore a net social loss. In general, the welfare loss resulting from a situation of monopoly can be approximated by the total consumer surplus which is lost. LEE, Y.-H. A. (2006) Competition, Consumer Welfare, and the Social Cost of Monopoly. Yale Law School.

of society. The public domain constitutes in fact a fundamental component of the copyright regime³⁶⁹ which may however be jeopardized as a result of the shift from a regime based on copyright law to a regime based on private regulation.

The licensing of a work under a particularly restrictive set of terms and conditions could in fact prevent users from engaging into any act of exploitation unless it has been specifically provided for by the licensing agreement and regardless of whether or not the activity would have been otherwise allowed under the copyright regime (e.g. because it would have fallen within the scope of copyright exemptions).³⁷⁰ Besides, contractual agreements may enable the owners of the copyright in a work to acquire an additional layer of protection over any type of information pertaining to the public domain.³⁷¹

The commodification of the public domain through a series of contractual rights regulating the access to and the use of information is likely to have a limiting effect over the production, the dissemination, and the overall consumption of information. Not only would it increase the costs for end-users to access or to consume information goods, but it is also likely to result in the establishment of an anti-common regime, where any given piece of information would be subject to an ever increasing number of rights and would therefore become increasingly difficult and costly to exploit.³⁷²

³⁶⁹ The public domain is necessary in order for the copyright regime to fulfill its original purpose of promoting creative activity. Indeed, the access to and the consumption of a large number of creative Works is a prerequisite for authors to be able to produce new works, since every original work of authorship essentially builds from the past. In particular, according to Jessica Litman, “the public domain should be understood not as the realm of material that is undeserving of protection, but as a device that permits the rest of the system to work by leaving the raw material of authorship available for authors to use.” See LITMAN, J. (1990) *The Public Domain*. *Emory Law Journal*, 39.

³⁷⁰ Copyright owners may attempt to engage into second degree price discrimination by charging different prices for the same Work licensed under different terms and conditions. In order for a price discrimination strategy to succeed, however, it may be necessary for the copyright owner to introduce a series of restrictions on the access to and the usage of a particular version of the work. This may be achieved by contracting around certain of the limitations of the copyright regime in order to be able to charge a lower price to any users willing to give up the privileges they have been granted with by default under the copyright regime. Accordingly, in order to succeed, the model of contractual price discrimination necessarily assumes that the provisions of the copyright regime are a simple system of default rules which can be overridden by contract. See COHEN, J. E. (2000) *Copyright and the Perfect Curve*. *Vanderbilt Law Review*, 53.

³⁷¹ Copyright law can be superseded by contracts in order to exercise control over information that is not subject to copyright protection, such as facts, ideas, or Works whose copyright has expired. Regardless of the default provisions of the copyright regime, contractual agreements can therefore be used in order to turn public domain information into a commodity whose exploitation can be regulated just like any other work which qualifies for copyright protection. For more details on the use of contracts for the commodification of information, see e.g. RADIN, M. J. (2004b) *Regulation by Contract, Regulation by Machine*. *Journal of Institutional and Theoretical Economics*, 160, 1-15.

³⁷² According to Michael Heller, an anti-common regime is characterized by a situation in which multiple owners hold effective rights of exclusion in a scarce resource and, as a result of the transaction costs generated by their individual behaviors, are likely to cause that resource to be under-exploited. See HELLER, M. A. (1998) *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*. *Harvard Law Review*, 111.. In order to avoid the emergence of an anti-common regime in the context of creative works, copyright protection has been limited in scope, in order to ensure that users may exploit a work for any purpose that would not cause unfair prejudice to the economic interests of the copyright owner, and in duration, in order to prevent that the copyright

In spite of the will of the parties, mandatory limitations on contractual freedom should be introduced when it is in the public interest to do so. Hence, while the State is responsible for the enforcement of contractual agreements between private parties, enforcement should, however, be limited to those contractual provisions which are consistent with the fundamental principles of the copyright system. It necessarily follows that any term and condition that violate the provisions of the copyright regime should, instead, not be enforced.³⁷³

As a general rule, therefore, private mechanisms of self-help may only succeed to the extent that they are ultimately supported by the laws of the State. End-user licensing agreements are ultimately subject to the scrutiny of the law in order to ensure that they incorporate the necessary trade-off of the copyright regime. To the extent that they prohibit the usage of a work in such a way that would have been otherwise allowed by copyright law, or that they purport to extend the scope of copyright protection to ideas, facts or other material belonging to the public domain, the State is allowed to intervene in order to restrain the autonomy and the contractual freedom of the interested parties.³⁷⁴ Moreover, with regard to the technological measures of protection, it has often been suggested that, insofar as certain contractual provisions may be automatically enforced by technological measures of protection, the laws prohibiting the circumvention thereof should only

vesting in a work preclude the exploitation thereof for an indeterminate period of time. However, given that private ordering is not subject to any of these limits, it may encourage the proliferation contractual rights vesting in the expression of a particular work. Exclusive rights may therefore accumulate and eventually overlap over the years, as the work is being licensed and/or used as a basis for the making of new works. In the end, regardless of the fee required by every individual right holder, an excessive number of transaction costs and/or the possibility for a single right holder to veto a particular usage of the work may also constitute an obstacle to the legitimate exploitation thereof. In view of this, private regulation of information goods is likely to result in the under-production and/or under-consumption of works. For more details, see e.g. ELKIN-KOREN, N. (1998) Copyrights in Cyberspace: Rights without Laws? *Chicago-Kent Law Review*, 73.

³⁷³ In order to protect its economic interests on the Internet network, copyright owners can rely on essentially four forms of protection: (1) the exclusive rights they have been granted with under the copyright regime, (2) the technical challenges that users have to face in order to successfully perform an infringing act, (3) the technological measures of protection that can be employed in order to restrict the access to and the use of a particular Work, and (4) the particular terms and conditions of the licenses under which a work has been released which can be enforced by contract law. As the first two forms of protection have been considerably jeopardized by the advent of Internet and digital technologies, a large number of right holders have begun to rely exclusively on the last two. In particular, the entertain industry has elaborated a number of particularly restrictive licensing schemes, which may sometimes go counter the provisions of the copyright regime. However, to the extent that copyright law has been designed to balance the interests of right holders with the interest of the collectivity, any contractual term that deviate from the tenets of the copyright regime should not be enforced. See HARDY, I. T. (1995) Contracts, Copyright and Preemption in a Digital World. *Richmond Journal of Law & Technology*, 1.

³⁷⁴ Copyright law introduces a series of property rights on the expression of a work in order to provide incentives for authors to create and disseminate their works. While it may protect the economic interests of right holders, the copyright regime is, however, grounded on values of public policy whose ultimate purpose is to provide society with a maximum number of works. The licensing of rights is however achieved by the means of contractual agreements which are exclusively driven by private interests and may eventually conflict with the traditional ratio of copyright law. Legal intervention may therefore be necessary in order to ensure that the original values of the copyright regime are respected in the context of private licensing schemes. See, in particular, ELKIN-KOREN, N. (1997) Copyright Policy and the Limits of Freedom of Contract. *Berkeley Technology Law Journal*, 12.

be enforced to the extent that the provisions they refer to are compatible with copyright law, competition law, or any other relevant body of law.³⁷⁵

³⁷⁵ The WIPO Copyright Treaty of 1996 called for the implementation of specific provisions against the circumvention of technological measures for the protection of copyright works and against the removal or alteration of the corresponding digital rights management information. The provision has been implemented in the USA by the Digital Millennium Copyright Act (the DMCA) in section 1201(a) - (b) and in the EU by the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society (the InfoSoc Directive) article 6. Both the DMCA and the InfoSoc Directive have been considerably criticized on the grounds that they do not allow for the circumvention of technological measures of protection in order to perform a legitimate act. Indeed, while section 1021(c)(1) of the DMCA provides that “nothing in this section shall affect rights, remedies, limitations, or defenses to copyright infringement, including fair use”, it is unclear whether fair use can actually constitute a defense against a violation of the anti-circumvention provisions. Similarly, while article 6(4) of the InfoSoc Directive provides “member states should take appropriate measures to ensure that right holders make available to the beneficiary of an exception or limitation provided for in national law [...] the means of benefiting from that exception or limitation,” this only applies “in the absence of voluntary measures taken by right holders, including agreements between right holders and other parties concerned.” A number of scholars have therefore been arguing that the provisions against the circumventions of technological measures of protection should be reformed in order to account for the copyright limitations. See, inter alia, SAMUELSON, P. (1999) Intellectual Property and the Digital Economy: Why the Anti-Circumvention Regulations Need to be Revised. *Ibid.*14, SAMUELSON, P. (2000) Towards More Sensible Anti-circumvention Regulations. *International Conference on Financial Cryptography*. London, UK, Springer-Verlag, NIMMER, D. (2000) A Riff on Fair Use in the Digital Millennium Copyright Act. *University of Pennsylvania Law Review*, 148, 673-742, BURK, D. L. & COHEN, J. E. (2001) Fair Use Infrastructure for Rights Management Systems. *Harvard Law Review*, 15, SAMUELSON, P. (2001) Anticircumvention Rules: Threat to Science. *Science*, 293, SINGER, P. (2002) Mounting a Fair Use Defense to the Anti-Circumvention Provisions of the Digital Millennium Copyright Act. *University of Dayton Law Review*, 28, SAMUELSON, P. (2003) DRM {and, or, vs.} the Law. *Communications of the ACM*, 46, DUSOLLIER, S. (2003) Fair use by design in the European copyright directive of 2001. *Communication of the ACM*, 46, 51-55.

ONTOLOGIES

OF COPYRIGHT WORKS

Part I has shown how the access and use of information on the Internet is being increasingly regulated by private ordering. The impact of copyright law on the regulation of information becomes weaker as right holders can extend or reduce the default level of protection by means of contractual mechanisms and technological measures of protection. While this can be done in many ways, over the past few years, two specific models have been widely adopted. DRM systems, on the one hand, are combined with restrictive contractual agreements in order to expand the standard scope of protection granted under the law and thereby maximize the economic returns of right holders. Open Content licenses, on the other hand, are concerned with reducing the scope of protection granted by default under the law, in order to achieve a broader dissemination and greater availability of works.

In spite of their divergent aims, these two models share an essential characteristic: they are concerned only and exclusively with a particular copy of the work, as opposed to the work as a whole. Licensing the copy of a work under a restrictive EULA or a liberal Open Content license does not preclude the copyright owner from releasing another copy of the same work under a completely different license – for the purposes of price discrimination or otherwise. End-user licensing agreements and Open Content licenses are therefore specific, not only to the user (or group of users) to which they have been addressed, but also to the particular copy of the work to which they refer.

While establishing the identity of a physical copy does not require any specific endeavor, identifying the scope of a digital copy necessarily qualifies as a more challenging task – which is often subject to controversies. The problem is that the concept of a ‘copy’ is not explicitly defined within the provisions of copyright law and none of the issues concerning its definition have thus far been addressed by judges.

This problem is specifically addressed in the second part of the thesis, which analyses the object of copyright law and the scope of a copyright license – to eventually come up with a comprehensive and yet specific definition of what may or may not qualify as a ‘copy’ for the purposes of copyright law, both in the physical and in the digital environment. This is achieved in the context of two ontological frameworks: the Functional Requirements for Bibliographic Records (FRBR) and the Information Artifact Ontology (IAO).

Imported from the realm of philosophy, ontologies have been employed in the context of information science in order to describe a specific domain of reality according to a particular conceptual framework. In order to do so, an ontology must identify all entities pertaining to that particular section of reality, together with their corresponding attributes and characteristics. Its fundamental function is to define and organize all relevant entities into a common taxonomy that illustrates the relationship they entertain with each other.

Hence, in the context of the copyright regime, an ontological framework concerned with the ontological status of copyright works must basically investigate the nature, the scope, and the identity of every work of authorship.

To the extent that it may refer to an indefinite number of things of different nature or kind – e.g. it may refer to a literary, musical, dramatic or artistic work, etc, the ontological status of the work of art is particularly difficult to determine. From an ontological perspective, this can be problematic because different works are necessarily composed of different elements that interact with each other in a different manner. Moreover, the common understanding of what constitutes a particular work of authorship is likely to differ according to the type of work that is taken under analysis. For instance, paintings or sculptures are for the most part regarded as individual entities that cannot be instantiated into more than one copy, whereas literary, musical, or dramatic works are more likely to be seen as entities that can be performed several times or that can be instantiated into many different copies. Ideally, in order to provide an accurate description of the ontological status of every work of authorship, a series of specialized ontologies should therefore be developed to individually address the specificities of these different kinds of works.

Yet, in spite of the divergence in their nature or form, different types of works are, nonetheless, likely to feature a series of common characteristics. In particular, one distinctive feature that is common to every work of authorship is that they all qualify as a particular form of information. Although they do not generally provide any explicit kind of information about the world that surrounds us, they necessarily constitute a particular representation of the world as it has been perceived and subsequently expressed by their corresponding authors.

Accordingly, as a particular subset of information, every work of authorship fundamentally shares the same characteristics as a public good. Indeed, after it has been communicated to the public in a particular medium of expression, it can subsequently be extracted and reproduced into a variety of other media in order to be consumed or enjoyed by different people, in different places and at different times.

Just as with any other piece of information, however, there is no universally accepted definition of what constitutes a work of authorship or any copy thereof. Given that their meaning may vary according to the context of analysis, a specific definition must necessarily be assigned to anyone of these terms before they can be employed in a particular field of application.

In the context of copyright law, although no precise definition has been provided by the copyright regime, it is possible to identify and to analyze the characteristics of every entity that is eligible for protection under the copyright regime in order to acquire a better overview of (a) the scope of copyright protection granted to a particular work of authorship, and (b) the object of the corresponding rights and obligations vesting into every copy of the work.

ONTOLOGICAL FRAMEWORKS FOR INFORMATION GOODS

As it has been illustrated in the previous sections, copyright law establishes a market for information goods by granting authors a series of proprietary rights over their original creations.³⁷⁶ However, to the extent that it protects the expression of any original work of authorship, the amount of copyrighted material is potentially very broad. A proper assessment of the copyright regime cannot therefore be achieved without providing a mechanism to identify the subject matter that is actually eligible for protection. The law provides a series of indications to determine whether a particular resource can be regarded as a work of authorship for the purpose of the copyright regime, but a fundamental question persists: What is a work and what does it really consist of?

In addressing this question, one of the main difficulties is that the notion of a work is a very flexible term which can be interpreted in a multitude of ways according to the context of analysis. The validity of every interpretation of the term is fundamentally related to the specific context in which it is being used and may eventually depend upon the proper interpretation of a series of other terms.

For the purposes of copyright law, in order to determine whether or not a particular piece of content can be regarded as a copyrightable work, it is necessary to understand the concept of a ‘work’. Yet, a copyrighted work is nothing more than a particular piece of information which has been turned into an information good because it possesses all the necessary characteristics required by the copyright regime in order to qualify as an original work of authorship. Accordingly, before engaging into the ontological analysis of a work, the quality of ‘information’ and the properties of ‘information goods’ must be established. Only then can the constitutive elements of a work be individually identified and their distinctive characteristics assessed.

³⁷⁶ For a detailed overview of the function assumed by copyright in creating a market for information goods by granting authors with a series of proprietary rights over the expression of their works so that they can be traded on the market, see *supra* Part I. Chapter 1: Copyright Law.

INFORMATION GOODS

In economics, an information good is a particular commodity whose market value does not derive from the physical structure of the good, but rather from the information that it conveys. While they may incorporate information of any kind, information goods are generally associated with the marketing of copyright works. A book which articulates a literary work, a CD which contains a series of musical works, or even a digital file which incorporates a particular piece of computer software are only a few examples of commodities which are commonly traded on the market of information goods.

As opposed to many other kinds of commodities, the marketing of information goods is inherently dependent upon the value of the particular piece of information they convey. In other words, information goods can only be regarded as a commodity to the extent that information has itself been turned into a commodity. By restricting the access and use of certain types of information, copyright law has partially achieved that objective.

Yet, in order to understand the extent to which copyright law has actually succeeded in turning a public good such as information into a private commodity which can be exchanged on the market for information goods, it is first necessary to analyze the properties and inherent characteristics of information and to acquire a better understanding of the nature of information goods.

A. THE NATURE OF INFORMATION

Information is a concept with a multitude of different meanings. As such, whether or not something qualifies as information ultimately depends upon the definition that has been assigned to the term ‘information’ in a particular context of analysis. In spite of the vast literature attempting to define the concept of information, there is still a lot of confusion concerning the actual import. The problem is mainly related to the fact that the notion of information has been understood in very different ways depending on whether the context is philosophy, sociology or technology.

For instance, according to the Oxford English dictionary, three principal usages of the word ‘information’ can be distinguished: (1) information-as-process, which consists in the action of telling or the fact of being told of something, (2) information-as-knowledge, which consists of the knowledge concerning some particular fact, subject, or event, and (3) information-as-thing, which refers to anything that has the quality of imparting knowledge or communicating information.³⁷⁷ The Merriam-Webster dictionary provides instead a more limited definition, according to which the term ‘information’ basically refers to either (a) the communication

³⁷⁷ Oxford English Dictionary (1989), vol. 7

or reception of knowledge, or (b) the actual knowledge that can be obtained from instruction or from investigation.³⁷⁸

The term 'information' seems to express different concepts depending on the context in which and the purpose for which it is employed. Information can be regarded as the resource which incorporates a symbolic structure (information as commodity, e.g. a book or a CD), the symbolic structure itself (information as intangible resource, e.g. the literary content of the book, or the bits expressing the content of the CD), or as the actual message that is being conveyed to the public through that symbolic structure (information as knowledge, e.g. the message of the book, or the meaning of the content of the CD, as understood by the public).³⁷⁹

Some ideas from knowledge management can help us in distinguishing the different dimensions of information. In particular in this context, a critical distinction is made between the concepts of 'data', 'information' and 'knowledge', by virtue of their peculiar characteristics and as a result of the different kind of value they provide to society.³⁸⁰ While data exclusively consists of descriptive facts about the world, information can be defined as a particular arrangement of data according to a logical structure, whereas knowledge can basically be regarded as a specific model of the world which can be constructed from a given set of information. Though data is only valuable to the extent that it conveys information about the real world, the value of information resides in the fact that it is a necessary input for the production of knowledge, which constitutes the main mechanism by which individuals decide how to react to the various stimuli they encounter in the physical world.

According this approach, data fundamentally consists of basic elements that represent aspects of the world around us (e.g. letters, digits, or names) but which have no meaning on their own.³⁸¹ Taken independently, individual pieces of data do not possess any value, but they can be combined together into a more valuable resource. Any type of data can theoretically be collected, categorized, organized, compiled or otherwise processed in order to produce information, which represents a particular arrangement of data that is useful or at least meaningful. As such, a valuable piece of information is generally the result of a process which may require a certain degree of effort and creative endeavor in order to produce an informative resource. Finally,

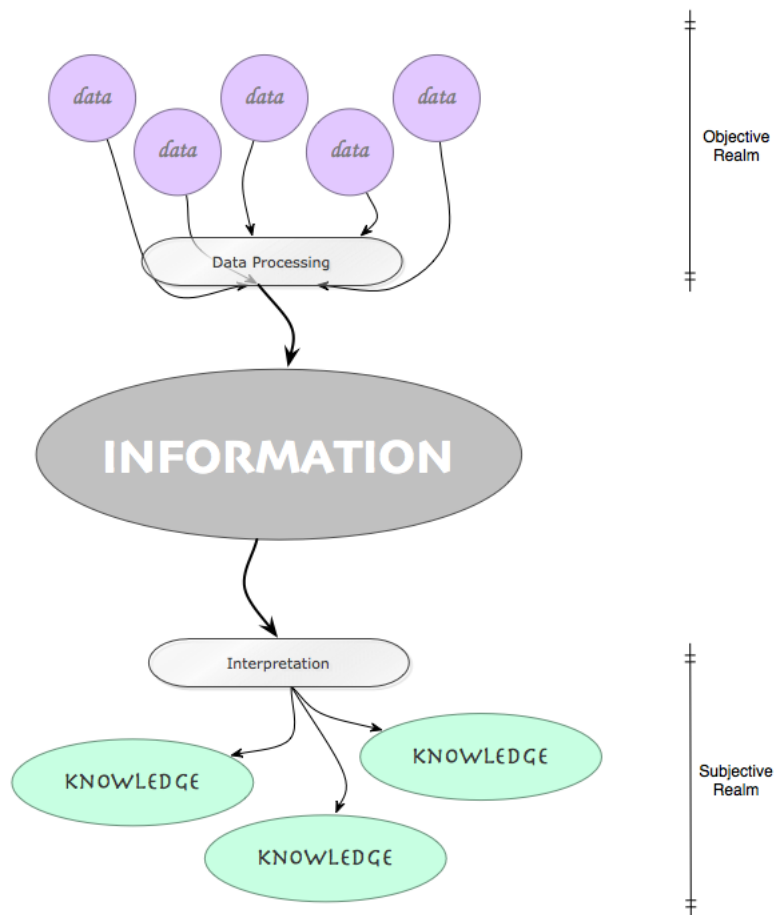
³⁷⁸ Merriam-Webster Dictionary: 'information' can be defined as: (1) the communication or reception of knowledge or intelligence, or (2) the knowledge obtained from investigation, study, or instruction which may basically consist of intelligence, news, facts, or data.

³⁷⁹ See e.g. MEADOW, C. T. & YUAN, W. (1997) Measuring the Impact of Information: Defining the Concepts. *Information Processing & Management*, 33, 697-714.

³⁸⁰ For more details on the distinction between data, information, and knowledge, see e.g. BOISOT, M. & CANALS, A. (2004) Data, information and knowledge: have we got it right? *Working Paper Series WP04-002*. Internet Interdisciplinary Institute (IN3).

³⁸¹ In knowledge management literature, the general understanding is that data are simple facts that turn into information as they are combined into meaningful structures. Data can therefore be regarded as simple observations of the various states of the world. Accordingly, data basically consists of a variety of symbols which have not yet been interpreted nor put into context, whereas information is data which has been assigned a meaning. As such, data is therefore a prerequisite for the production of information. For a broader overview of the various meanings assigned to data in knowledge management literature, see e.g. TUOMI, I. (1999) Data is More than Knowledge: Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory. *Journal of Management Information Systems*, 16, 107-121.

information can subsequently be assimilated by a particular agent and be converted into knowledge. In this particular sense of the term, knowledge is the result of a cognitive process which requires a positive effort from the agent to which information is imparted. In order to acquire understanding, the agent necessarily has to interpret the content of information according to a series of subjective principles or criteria which will contribute to shaping the state of its knowledge.³⁸² As opposed to data or information - which can both be objectively identified in the real world - knowledge is therefore a resource which is specific to the agent who produced it.



According to this perspective, in order for it to be assimilated by third parties, knowledge must either be (a) consensually imparted by the agent who originally produced it, or (b) reconstructed from the same base of information. Because of its personal character, knowledge is not a good candidate for free-riding, because it

³⁸²As opposed to data and information, knowledge is inherently personal and subjective. As such, knowledge can only emerge after a certain piece of information has been interpreted by the recipient, and after it has been internalized according to their respective experiences and understandings of the world. For more details on the distinctive characteristics of knowledge as it has been defined in the framework of knowledge management, see e.g. HEY, J. (2004) *The Data, Information, Knowledge, Wisdom Chain: The Metaphorical link*. University of California at Berkeley.

cannot be appropriated by anyone without incurring into most of the costs incurred by the original agent.³⁸³ As opposed to information, which requires much more effort to produce than to consume (e.g. writing a book is much more costly than reading it), the appropriation of knowledge often requires a similar amount of effort (e.g. in order to comprehend the content of a book, everyone has to process and understand the information contained in the book). In spite of the value it may bring to society, knowledge is therefore unlikely to require any kind of legal protection.

Information, on the other hand, is a valuable resource which can be easily appropriated by third parties without incurring into any significant cost on their part. As a general rule, data processing is likely to generate value for society insofar as it provides a basis for the acquisition of knowledge. The value of information resides in the fact that it constitutes a shortcut for people to acquire a particular piece of knowledge without incurring into the costs of gathering and processing the relevant data themselves. Although knowledge still has to be produced by every individual user, the costs of gathering data and processing it into meaningful information do not have to be replicated. The problem is that information can be immediately reproduced and further redistributed by anyone and at very low costs. After it has been disclosed to the public, the dissemination and usage of information can no longer be controlled by the original producer, who can no longer expect to be remunerated for the initial costs of production. Insofar as it possesses the characteristics of a public good,³⁸⁴ information may therefore require some kind of legal protection in order to reduce the likelihood of free-riding over the investment of others.³⁸⁵

Similarly, data could indirectly qualify for protection to the extent that it has been compiled or reorganized in such a way as to produce a valuable resource. While the data itself does not provide any value as such, the compilation of data qualifies as a particular piece of information which may require some basic form of protection to the extent that it can be appropriated by anyone. Unless the law can provide the means to avoid

³⁸³ The consumption of information is necessary but as such not sufficient to produce actual knowledge. Interpretation by a particular individual is required in order to turn any given piece of information into knowledge. Yet, to the extent that the process of interpretation is a predominantly subjective process which is directly connected to the individual by which it is being carried out, interpretation cannot be easily emulated by a different individual without expending the very same amount of resources necessary to perform a critical analysis of the relevant information. Knowledge constitutes therefore a scarce resource which cannot be either reproduced or shared amongst third parties and may not consequently qualify as a public good. For more details on the distinction between knowledge, data and information and a more detailed analysis of the activities involved in the process of knowledge formation, see e.g. BELLINGER, G., CASTRO, D. & MILLS, A. (2004) *Data, Information, Knowledge, and Wisdom*.

³⁸⁴ According to economic theory, any resource that is both non-rival and non-excludable can be regarded as a public good. With regard to information, insofar as it can be consumed by multiple persons at the same time, it is essentially non-rival in consumption. Moreover, to the extent that it is very difficult to prevent anyone from consuming a particular piece of information without any specific legal or technological measures, information can also be regarded as being fundamentally non-excludable. For a more detailed description of information as a public good, see *supra* Part I. Chapter 1: Copyright law.

³⁸⁵ From an economic perspective, the intellectual property regime can be justified through the notion of free-riding. Since information can theoretically be assimilated by and redistributed to anyone, a series of exclusive rights are granted to the original producer of a particular type of information good, in order to avoid free-riding over the initial investment which was necessary in to create that particular information good in the first place. For more details, see e.g. BARRON, A. (2008) *Copyright infringement, 'free-riding' and the lifeworld. Law, Society and Economy working papers*. London, UK, London School of Economics and Political Science (LSE).

free-riding over the investment of others, there is in fact a risk that certain compilations of data or other important resources may not be produced.

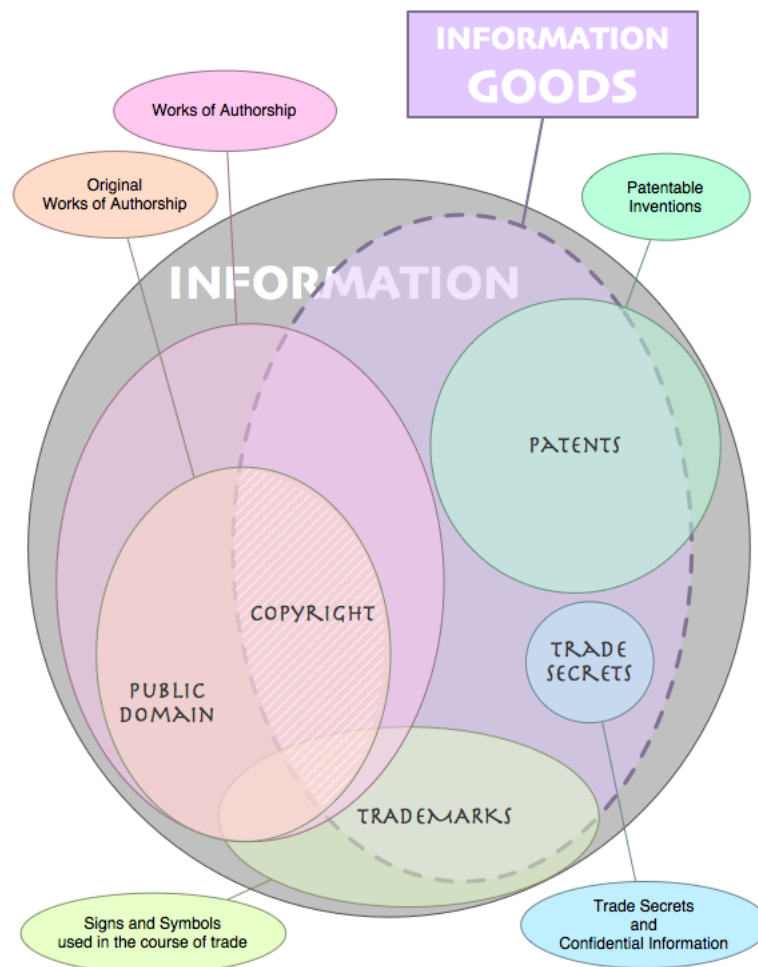
B. THE NATURE OF INFORMATION GOODS

Once the nature of information has been properly established, the next task is to provide an accurate definition of what constitutes an information good and to determine how does a work of authorship actually relates to that concept. In particular, to the extent that different types of information goods are likely to feature different characteristics, they should necessarily be distinguished in order to be more accurately dealt with.

To begin with, in order to properly understand the notion of an information good, one critical concern is to identify whether the concept ultimately refers to a tangible or to an intangible entity. In the common sense of the term, information goods can in fact be subdivided into two distinct categories: the category of material information goods (i.e. tangible commodities), which basically refers to the specific medium that incorporates a particular piece of content, and the category of immaterial information goods (i.e. intangible commodities) which consist of the content itself. The latter category essentially comprises anything that can be regarded as a particular piece of information (e.g. the content of a book, the score of a melody, or the content of digital file), whereas the former comprises anything that could provide a support for information (e.g. a piece of paper, a CD-ROM, or a magnetic pattern on the hard disk of a computer).³⁸⁶

For the purposes of this research, the term ‘information good’ will be used to refer exclusively to the content which has been embodied into a particular medium of expression, as opposed to the medium itself. Accordingly, while the nature of the information carrier may vary according to the circumstances, the nature of an information good will always be strictly and rigorously intangible. As such, information goods are subject to a different set of laws than those governing physical goods and should consequently be regulated by a different legal regime, namely, the regime of intellectual property law.

³⁸⁶ To determine what can or cannot be regarded as information can be very difficult, since, whether something is informative or not ultimately depends on the context it is in and the perspective from which it is being assessed. Almost anything is in fact capable of conveying information, to the least, because any object or event inevitably reveals information about itself. Accordingly, virtually anything can be regarded as information to the extent that the information it convey is considered to be sufficiently pertinent to the relevant framework of analysis. The quality of something as being informative is therefore both subjective and contingent to the current state of affairs. Accordingly, to the extent that it provides information about itself, any physical resource ultimately qualifies both as a material and as immaterial information good. See BUCKLAND, M. (1991a) Information as thing. *Journal of the American Society for Information Science*, 42, 351-360.



The regime of intellectual property law is composed of a series of different legal doctrines (i.e. copyright, patents, trademarks and trade secrets) which, although all based on the similar principles and justifications, nevertheless distinguish themselves according to their structure (i.e. the type of exclusive rights granted to the right holders), their scope (i.e. their duration and other eventual limitations) and, most importantly, according to their sphere of application (i.e. the type of information they refer to). Accordingly, while patents are ultimately meant to protect inventors against the unauthorized use of an innovative idea, trade secrets merely protects the right to confidential information, regardless of the novelty thereof. Copyright, instead, essentially protects the original expression of an idea, whereas trademarks ultimately protect the usage of a sign in the course of a commercial activity.

In spite of the important role it assumes in the market for information goods, copyright law is not the only body of law concerned with the commodification of information. While every original work of authorship protected by copyright law necessarily qualifies as an information good, not every information good would necessarily qualify as a work under the copyright regime. Other areas of law (such as trademark law, patent law, or trade secrets) may equally contribute to the production of information goods - which may or may not be eligible for protection under the copyright regime.

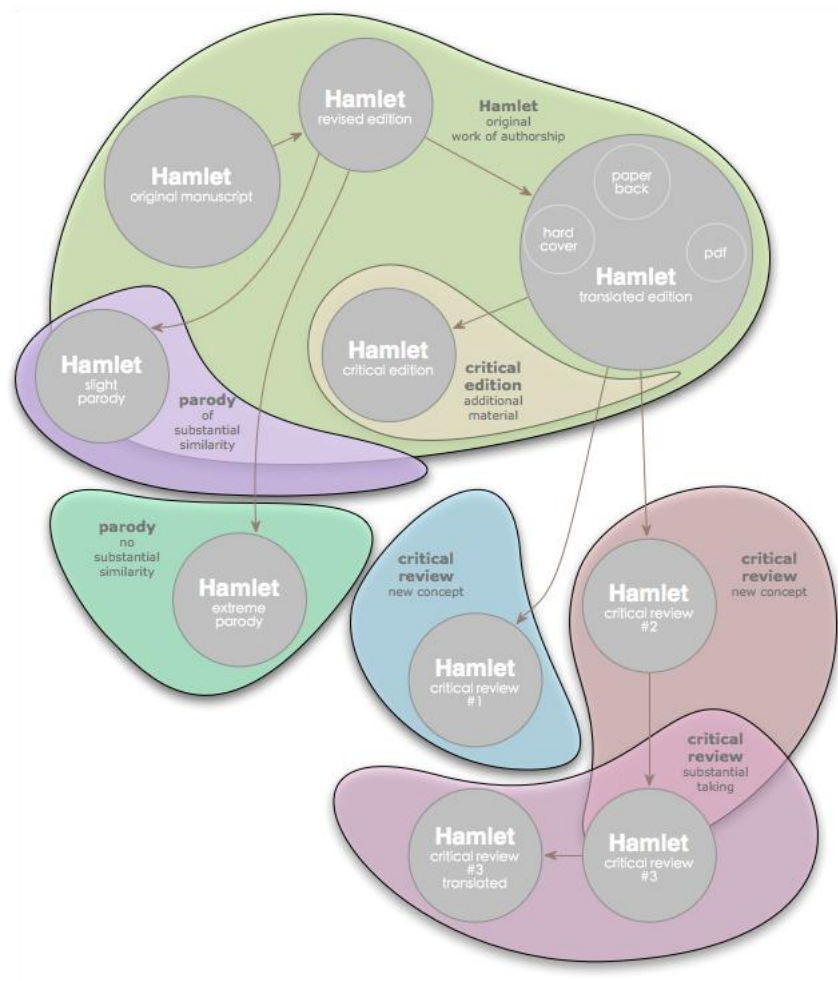
The scope of intellectual property is such that, according to the focus of analysis, different areas of law could theoretically protect the very same piece of information. For instance, the expression of a literary work could

be entitled to protection under the copyright regime insofar as it qualifies as an original work of authorship, the information it conveys could be protected under the regime of trade secrets to the extent that it discloses some kind of confidential information, whereas the use of certain elements of the literary works may be regulated by the provisions of trademark law.

The object of this research, however, is not concerned with intellectual property as a general body of law, but only with the role assumed by copyright law in the regulation of information, by converting a particular piece of information into an information good.

The difficulty lies in the fact that any given work of authorship can theoretically be expressed in an indefinite number of ways, which may significantly differ from the way in which the work has been originally expressed (in spite of them being all somehow related to each other by way of a genetic link). Because the copyright only refers to the original expression of a work, every new articulation of the work will only be granted protection with regard to those elements which are actually original - in the sense that they originate from the author. Every other element of the expression taken from a previous articulation of the work will not be included within the scope of the new copyright, but will instead be protected by the previous bundle of rights (if any).

As a result, any work of authorship whose constitutive parts have been derived from one or more works will not be subject to a uniform level of protection under the copyright regime. While it may actually be granted a copyright in its own right, the components which have been borrowed from the other works will remain property of their respective authors.



As a general rule, any given work of authorship may be subject to one or more copyrights which may actually refer to different aspects of the work (e.g. different sections of a literary work could be subject to different copyrights if they have been created by different authors; the melody of a song is subject to a different copyright than the lyrics thereof). Yet, to the extent that they can be subject to a different set of rights and obligations, the actual scope of the copyright vesting in the work as a whole cannot be properly established without a previous assessment of the level of protection that is granted to every element of the work.

In order to determine their corresponding eligibility for protection, the relationship that subsists between copyright law and the constitutive elements of a work must be thoroughly investigated. Regardless of the level of granularity involved, the copyright vesting into the various components of the work is likely to provide a different level of protection according to the specific layer of abstraction that is taken into consideration. Accordingly, the extent to which a particular work of authorship can actually be regarded as an information good can only be determined after having identified (a) the various components of a work which have been recognized under copyright law, and (b) the level of protection they have been granted with under the copyright regime.

In this regard, an ontological analysis may be particularly valuable, not only in order to identify the constitutive elements of a work, but also in order to define the relationship they have with one another, as well as to

describe the way in which the provisions of the copyright regime actually relate to each one of those elements. Ideally, such analysis could eventually lead to the implementation of an ontological framework that is capable of describing a variety of entities at different levels of abstraction and with different degrees of granularity according to the corresponding needs of right holders and end-users.

SECTION 2

ONTOLOGICAL FRAMEWORKS

To begin with, a distinction must be made between the philosophical notion of ‘ontology’ – whose object is the study of things in a particular domain of reality - and the more practical concept of ‘an ontology’ – which represents the product of such an investigation, or, more generally, the conceptual structure on which a particular view of reality is based.

In other words, ontology, in the original sense of the word, is a section of philosophy that is concerned with the identification and organization of things that exist (or may exist) in a particular portion of reality.³⁸⁷ An ontology, on the other hand, is a tool that enables the systematic representation of things which have been assumed to exist in a particular domain of interest. A further distinction is necessary to differentiate between realist ontologies that describe the objective structure of a domain in order to produce an accurate representation of reality, and subjective ontologies that describe the conceptualization of a domain according to the way people organize their understanding of reality.³⁸⁸

Finally, it is possible to distinguish between philosophical ontologies and computer-science ontologies specifically designed to support IT applications.³⁸⁹ Originally defined by Tom Gruber as the “specification of a

³⁸⁷ Ontology is a branch of philosophy which focuses on the study of what does or what might exist in any given area of reality. It analyses the types and structure of different objects, properties, events, process and relations. Coined in 1613 by Rudolf Gockel in *Lexicon philosophicum* and by Jacob Lorhard in *Theatrum philosophicum*, the term has been officially recognized in 1721 when it has been recorded in Bailey’s dictionary as “an account of being in the abstract”. See SMITH, B. (2003) Ontology and Information Systems. IN FLORIDI, L. (Ed.) *Blackwell Guide to the Philosophy of Computing and Information*. Oxford, Blackwell.

³⁸⁸ According to the Aristotelian tradition, realist ontologies aim at developing a science of categories (universals), at identify what kinds of categories exist and describing their features and connections, in order to produce an accurate representation of the structure of reality. See SMITH, B. (2004) *Beyond Concepts: Ontology as Reality Representation*. According to a more Kantian or constructivist approach, subjective ontologies, instead, are concerned with the representation of the cognitive structures through which humans organize their view of reality. See MASOLO, C., BORGO, S., GANGEMI, A., GUARINO, N. & OLTREMARI, A. (2003) WonderWeb Deliverable D18. Laboratory For Applied Ontology - ISTC/CNR. In the legal domain, however, it is difficult to distinguish clearly these two kinds of approaches, given that the law is a social and normative reality which is also determined by people’s views about it. See SARTOR, G. (2008) The Nature of Legal Concepts: Inferential Nodes or Ontological Categories? *Working Paper*. European University Institute.

³⁸⁹ Computer-science ontologies are often used to organize databases, enable conceptual information retrieval, or ensure interoperability between different applications concerned with the same domains. While they are nonetheless based on philosophical concept, the focus is the translation of a conceptual scheme into a computable representation of concepts. See GRUBER, T. R. (1993b) A Translation Approach to Portable Ontologies. *Knowledge Acquisition*, 5, 199-220.

conceptualization”,³⁹⁰ the term ‘ontology’ has been subsequently adopted in the realm of information science - where it has been more narrowly defined as “the formal specification of a vocabulary in order to express a particular base of knowledge”.³⁹¹ In the field of information science, therefore, an ontology is now commonly regarded as a formalized terminology that can be employed to represent concepts into an organized structure. Specifically, an ontological framework identifies the various entities that belong to a particular portion of reality and subsequently categorizes them into a particular set of classes interconnected through a series of fundamental relationships. While the actual implementation of any ontological framework ultimately depends upon its corresponding level of complexity, its underlying structure necessarily assumes the form of a taxonomy in which a particular set of concepts are organized according to a relationship of subsumption.³⁹² Yet, an ontology generally distinguishes itself from a basic taxonomy to the extent that it provides a better account of the concepts it defines, by allowing for the description of their individual attributes and the identification of the corresponding relationships they entertain with each other.

Accordingly, while the definition may differ according to the context of analysis,³⁹³ for the purposes of this research, an ontology will be taken to constitute a catalogue of the various entities which are assumed to exist within a specific portion of reality, where every entity has been systematically organized into a formalized structure. Ontologies have thus far been deployed in a variety of fields, such as medicine,³⁹⁴ law,³⁹⁵ electronic

³⁹⁰ In computer science, an ontology has been defined by Tom Gruber as the “specification of a conceptualization” where such conceptualization is to be intended as “an abstract and simplified view of the world that we wish to represent for some purpose”. See GRUBER, T. R. *Ibid.* A translation approach to portable ontologies.

³⁹¹ In the field of information sciences, an ontology is generally regarded as a unifying framework which serves as the basis for enabling communication between different actors committing to use a given vocabulary and a particular conceptualization of reality in a consistent manner. Accordingly, an ontology does not, as such, qualify as the actual knowledge-base, but merely constitutes the vocabulary that is used therein. For more details, see GANDON, F. (2002) *Ontology in a Nutshell*. INRIA.

³⁹² A taxonomic scheme is a particular classification of entities arranged in a hierarchical structure, typically according to a subsumption relationship (i.e. supertype-subtype relation). The hierarchy is such that, as a result of inheritance, every subtype is by definition subject to the same attributes, properties and constraints as the supertype, in addition to its own individual attributes, properties and constraints. Originating from the field of biology (see e.g. the Linnaean taxonomy), the term has now grown to comprise any generic hierarchical system of concepts, such as the field of economy and sciences where the relationship of subsumption cannot always be unequivocally established as in biology. For a more general overview of the distinctive characteristics of a taxonomic model, see MERTINS, K., HEISIG, P. & VORBECK, J. (2003) *Knowledge Management*. Springer.

³⁹³ The term ‘ontology’ is currently being used in many different ways. First coined in 1613 by the philosophers Lordhardus and Goclenius, the term only appeared into an English dictionary in 1721, where it was defined as ‘an account of being in the abstract’. While the concept did not develop for a long time, it has been recently adopted into the realm of artificial intelligence and information systems, where the definition of the term has evolved towards the more specific notions of knowledge engineering, conceptual modeling and logical semantics. While the term has retained its original definition in the philosophical context, it is nowadays used to refer to a variety of other things, including, but not limited to: catalogs, glossaries, thesauruses, taxonomies, and so forth. See SMITH, B. & WELTY, C. (2001) *Ontology: Towards a New Synthesis*. *Proceedings of the international conference on Formal Ontology in Information Systems*. Ogunquit, Maine, USA.

³⁹⁴ See e.g. the Gene Ontology at www.geneontology.org, an ontology aimed at producing a controlled vocabulary that can be applied to all organisms; the MedO, a bio-medical ontology developed and maintained by the Institute of Formal Ontology and Medical Information Systems (IFOMIS) at www.ifomis.org; the FMA (Foundational Model of Anatomy) ontology, an Open Source ontology developed by the Structural Informatics Group at the University of Washington at sig.biostr.washington.edu/projects/fm/;

commerce,³⁹⁶ and other fields. The structure and the design of these different ontologies is however likely to differ according to the context in which they are actually intended to be used.

A. LEGAL ONTOLOGIES

In the context of law, a number of ontologies have already been developed so far. They each have assumed a distinctive structure which ultimately reflects their actual or prospective fields of applications.³⁹⁷ Over the past few years, a variety of ontologies have emerged in the legal domain in order to develop a more comprehensive basis of legal knowledge and to promote the deployment of legal information management systems. Yet, as they attempt to identify the basic entities that populate a particular domain of law and to describe their corresponding attributes and relationships, legal ontologies necessarily have to deal with a series of conceptual constructs and common sense notions which are implied within the general theories of law.³⁹⁸

and Galen (Generalized Architecture for Languages, Encyclopaedias and Nomenclatures in medicine), a high-level ontology for medicine developed by the OpenClinical organization and available at www.openclinical.org.

³⁹⁵ See e.g. the FOLaw (Functional Ontology of Law), a functional ontology aimed at identifying the functional dependencies between different types of knowledge involved in legal reasoning; the LRI-Core Ontology, a top-level ontology which covers the main concepts which are common to all legal domains, available at www.leibnizcenter.org/project/previous-projects/lricore; the Frame-Based Ontology, the CLO (Core Legal Ontology), a core ontology for the legal domain available at www.loa-cnr.it/ontologies/CLO/; and the LKIF-Core Ontology, a major European ontology of basic legal concepts which consists of 15 modules that each describes a set of closely related concepts from both legal and commonsense domain, available at www.estrellaproject.org/lkif-core.

³⁹⁶ See e.g. the MULECO (Multilingual Upper Level Electronic Commerce Ontology), an ontology for describing and identifying the relationships between electronic commerce applications and the ontologies used to describe them, available at xml.coverpages.org/muleco.html; the MKBEEM (Multilingual Knowledge Based European Electronic Marketplace) an ontology domain modeling support for multi-lingual services in e-commerce, available at mkbeem.elibel.tm.fr; SNAP (Situations, Needs, Actions, and Products), an action-based ontology for e-commerce reasoning; and, more generally, the Commerce Ontology which describes the basic concepts of commerce, such as suppliers, manufacturers, and products, available at www.cs.umd.edu/projects/plus/SHOE/onts/commerce1.0.html.

³⁹⁷ See e.g. the LKIF-Core Ontology at <http://www.estrellaproject.org/lkif-core/>, a major European ontology of basic legal concepts which consists of 15 modules that each describes a set of closely related concepts from both legal and commonsense domain; the Functional Ontology for Law (FOLaw), which describes and explains dependencies between different types of knowledge employed in legal reasoning; the LRI-Core Ontology at <http://www.leibnizcenter.org/project/previous-projects/lricore>, a top-level ontology which covers main concepts that are common to all legal domains and purports to reflect abstract and common sense concepts that are used to interpret the law; etc. More precisely, in the context of IP law, see e.g. the Copyright Ontology, a simple ontology which has been designed with the idea to support the development of copyright-aware DRM systems by providing a comprehensive framework for representing copyright value chains and the associated flow of rights and obligations; the IPRonto, an ontology for the DRM domain which has been specifically designed to facilitate the development of e-commerce applications that need to be aware of rights associated to specific multimedia content. For more details on the most recent developments of these two ontologies, see <http://rhizomik.net/html/ontologies/copyrightonto>

³⁹⁸ Legal ontologies distinguish themselves from other domain ontologies to the extent that, in order to accurately represent legal knowledge, they must take into account of a series of common sense notions which are embodied into the legal domain without being explicitly expressed. The language used to express legal concepts must therefore be interpreted according to general theories of law,

More precisely, in the context of Intellectual Property law, a number of ontologies have been developed with the intention of endorsing the development of intelligent Digital Rights Management systems. Indeed, as a result of the inherent malleability and worldwide dissemination of digital content, the identification and enforcement of rights has become an increasingly difficult task in the digital environment.³⁹⁹ A properly designed ontological framework could therefore be a valuable tool to achieve a greater understanding of the different rights and obligations associated with a particular piece of content.

In this respect, the Digital Rights Ontology (DRO) provides an ontological framework for the identification of Intellectual Property rights vesting in digital content and for the analysis of the impact that different copyright licenses may have over the exercise of these rights.⁴⁰⁰ The DRO can therefore be regarded as a formal language with a particular vocabulary that can be used in the context of DRM systems in order to identify the Intellectual Property rights vesting into any given piece of content. The objective of the DRO is to represent the nature and the scope of different rights by explicitly defining them as a pattern of constrained and/or permitted activities.⁴⁰¹ As such, the entities defined within the framework of the DRO do not refer to any of the stakeholders involved (e.g. copyright owners, licensees, etc), nor do they actually identify the particular object of these rights (i.e. the actual subject matter).

Similarly, the IPROnto⁴⁰² is an ontological framework which has been specifically designed to be used in the context of DRM systems. Its objective is to support the development of e-commerce applications that need to

rather than being induced from empirical or cognitive findings. See DOERING, J. & HERBERGER, M. (2006) Ontologies in the Legal Domain. *Problems of Legal Informatization*, 2.

³⁹⁹ On the one hand, Internet and digital technologies allow for the reproduction of digital content to be performed at very low costs and without any quality loss, and for the distribution thereof to be achieved instantaneously and on a worldwide scale. See DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press. On the other hand, the malleability of digital media allows for information to be revised or manipulated by anyone, at any time and in an indefinite number of ways without actually affecting the original version thereof. See RUTENBECK, J. (2000) The 5 Great Challenges of the Digital Age. *NetConnect*, Fall 2000. Copyright enforcement has therefore become particularly difficult on the Internet, in view of the complications involved in keeping track of every piece of content that travels on the network.

⁴⁰⁰ The Digital Rights Ontology (DRO) is being developed as part of the CASPAR project in order to provide an ontological framework for the formalization of copyright licenses which builds upon existing standards and established ontologies such as the CIDOC CRM and the FRBR. In particular, the DRO identifies four different categories of entities that interrelate with each other: (1) the legal framework determines (2) the individual rights granted to rights holders, which in turn allow for the making of (3) contractual agreements between the licensor and the licensee, in order for the former to establish (4) the particular set of actions that may or may not be performed by the latter. For a more detailed overview, see PRANDONI, C., VALENTINI, M. & DOERR, M. (2009) Formalising a Model for Digital Rights Clearance. IN AGOSTI, M., BORBINHA, J. & KAPIDAKIS, S. (Eds.) *Research and Advanced Technology for Digital Libraries*.

⁴⁰¹ By defining every right as a particular pattern of constraints and permissions, the DRO allows for any user's activity to be matched against the pattern that describes both the rights granted to the copyright owner under the copyright regime and the rights granted to end-users by the means of copyright licenses, so as to eventually determine whether or not that particular activity can be legitimately performed. While this may not always be possible to automatically assess the matching of these patterns, the DRO provides nonetheless a model to evaluate the legitimacy of users' actions. For more details, see *Ibid*.

⁴⁰² The IPROnto is an ontology of the Digital Rights Management domain. It has been designed in compliance with the DRM MPEG-21 standards with the idea to facilitate the interoperability of DRM systems by providing a framework that integrates the MPEG-21

account for the various rights and obligations associated with digital content. Rooted into an upper-level ontology (SUMO), the IPROnto is a mid-level ontology that purports to define certain entities that pertain to the domain of copyright law. As opposed to the DRO, the IPROnto is not exclusively concerned with the description of Intellectual Property rights, but also with the identification of any legal entity which has the capacity to exercise or enjoy one of these rights (e.g. authors, right holders, or end-users). It also refers to the subject matter of these rights, such as, e.g. the abstract idea of a work, its physical representations (manifestation), and its temporal representation (expression), although it does not define them as such.⁴⁰³

In view of the complexities of the copyright regime, the IPROnto has been further developed into a more comprehensive ontology, the Copyright Ontology, which purports to provide a broader and more detailed conceptualization of the copyright value chain and the associated flow of rights and obligations.⁴⁰⁴ The Copyright Ontology specifically formalizes the notion of a ‘creation’ as an entity which can basically assume three different forms: an abstract form (i.e. Abstractions representing the general concept of a work), a physical form (i.e. Objects such as the Manifestation, the Fixation, or the various instances of a work), and a temporal form (i.e. Processes such as the Performance or the Communication of a work). While it definitely constitutes a preliminary attempt to analyze the nature of the work of art, it does not qualify as a proper ontological analysis thereof but rather as a mere classification of works according to their nature or type.

As valuable as these tools might be when it comes to the formalization of intellectual property rights, none of them are sufficiently detailed to provide a proper conceptualization of the various elements that constitutes a ‘work’ for the purposes of copyright law.

Rights Expression Language and Rights Data Dictionary. In particular, the IPROnto can be subdivided into two main categories of entities: (1) the Static View which comprises any Entity, either Physical (e.g. any Object or Process) or Abstract (e.g. any Legal Concept, such as Legal Entities or Intellectual Property Rights); and (2) the Dynamic View which comprises any event that is likely to have an impact on the exercise of IP rights, such as e.g. the creation of a work, the transfer or the transformation thereof, the release of a copyright license, or the mere exploitation of the work. For a more detailed overview, see DELGADO, J., GALLEGOS, I., LLORENTE, S. & GARCIA, R. (2003) IPROnto: An Ontology for Digital Rights Management. IN BOURCIER, D. (Ed. *Jurix 2003: Legal Knowledge and Information Systems*. IOS Press.

⁴⁰³ The IPROnto implements a sub-ontology that represents the domain of a ‘Creation’. It basically constitutes the union amongst the abstract form of a work, i.e. the general idea (defined as the Abstraction), the material form, such as a book (defined as the Manifestation), and the temporal form thereof, such as the performance of a play (defined as the Expression). For instance, with regard to the creation of ‘Les Misérables’ by Victor Hugo, it can be observed in different Manifestations (e.g. in a script, or in a book) and in different Expressions (e.g. the performance of the script, or the reading of the book), which all have in common the same Abstraction (the same general idea) that derives from the original endeavor of Victor Hugo. See Ibid.

⁴⁰⁴ The Copyright Ontology has been developed with the idea of promoting the development of Digital Rights Management systems capable to understand and to cope with the specificities of the copyright regime. As such, it provides a full conceptualization of the copyright domain which has been subdivided in three fundamental parts: (1) the Creation Model which attempts to formalize the various entities that may result from the process of creation, in terms of Abstractions (i.e. the Work as an intellectual or artistic creation), physical Objects (e.g. the Manifestation, the Fixation, or the Instance of a Work), and Processes (such as Performances and Communication); (2) the Rights Model which includes all of the economic, moral, and related rights granted under the copyright regime; and (3) the Action Model which refers to the various activities regulated by the provisions of copyright law. For a more detailed overview, see GARCIA, R. (2005) A Semantic Web Approach to Digital Rights Management. *Department of Technologies*. Barcelona, Spain, Universitat Pompeu Fabra.

In order to provide a basis for the proper functioning of DRM systems, an ontology should be designed in such a way as to make it possible for automated systems to identify the various elements that constitute a work and to determine their identity according to a predetermined set of rules. Only then is it possible to establish their respective level of protection granted under the copyright regime.⁴⁰⁵ Moreover, in the context of any end-user licensing agreement that regulates the exploitation of only one particular copy of the work, the possibility to rely upon an ontological framework that is capable of establishing the identity of any given ‘copy’ of the work has become an essential prerogative, especially in the digital environment where the mere concept of a ‘copy’ has become ever more difficult to define. A series of objective standards and criteria should therefore be provided in order to determine whether - and when - are the different instances of a work to be considered equivalent to each other.⁴⁰⁶

In other words, if it is to be employed to determine the scope of protection granted to any original work of authorship in the context of copyright law, an ontology that merely identifies the scope of the exclusive rights granted under the copyright regime is unlikely to be satisfactory without an actual definition of the object of these rights as they refer to different aspects of the work that is being licensed. An accurate formalization of the copyright regime requires the object of the copyright to be properly investigated, in order to identify (a) the entities with regard to which authors and copyright owners have been granted a series of exclusive entitlements - in terms of both economic and moral rights, and (b) the extent to which users may eventually acquire a particular set of derived entitlements.

Yet, insofar as they do not distinguish between the constitutive elements of an original work of authorship, none of aforementioned ontologies can be relied upon in order to determine the object of copyright protection. In particular, given that the object of the rights licensed under a copyright license may relate to different components of the work, the proper ontological assessment of any copyright license cannot be limited to the examination of the rights and obligations assigned to the licensees, nor to the mere identification of the work in which the copyright belongs. Instead, it should include the analysis of every single component of the work to which the various terms and conditions of the license ultimately refer. In spite of their overall

⁴⁰⁵ In the context of copyright law, ontology must necessarily be designed in a way that is more compliant with the provisions of the copyright regime. See e.g. the Copyright Ontology, a simple ontology which has been designed with the idea to support the development of copyright-aware DRM systems by providing a comprehensive framework for representing copyright value chains and the associated flow of rights and obligations; the IPROnto, an ontology for the DRM domain which has been specifically designed to facilitate the development of e-commerce applications that need to be aware of rights associated to specific multimedia content. For more details on the most recent developments of these two ontologies, see <http://rhizomik.net/html/ontologies/copyrightonto>

⁴⁰⁶ Ontologies must necessarily incorporate a series of identity criteria, which basically provide the ontological conditions for the identity of one entity to be established. In other words, for every entity that populates the taxonomy, there must exist at least one criterion allowing to determine whether a particular instance is to be regarded “equal” to another instance thereof. The criterion is basically the answer to the following ontological question: “if a and b are both an instance of X, what is for the object a to be identical to b?”. Accordingly, identity in an ontological context can be defined according to arbitrary conditions and does not therefore necessarily relate to the common sense definition of the term. For instance, if “parallelism” is taken as an identity criterion, one line will be regarded as being identical to another in so far as they share an identical direction. See CARRARA, M. & GIARETTA, P. (2000) On Identity Criteria. IN NIMTZ, C. (Ed. *Arguments and Analysis*. 4th International Congress of the Society for Analytical Philosophy. and more generally, FREGE, G. (1884) *Die Grundlagen der Arithmetik. Eine Logisch-Mathematische Untersuchung über den Begriff der Zahl*, Oxford, Blackwell.

significance in the legal domain,⁴⁰⁷ the structure of most legal ontologies concerned with copyright law is likely to be inadequate in order to provide a complete and comprehensive analysis of the exclusive rights granted under the copyright regime.

B. ONTOLOGIES OF INFORMATION

In order to properly establish the extent to which the various terms and conditions of a copyright license can actually affect the exploitation of different instances of a work, it is not only necessary to identify the scope of the exclusive rights that are being licensed, but also to provide a proper definition of the object to which these rights may ultimately refer. While the nature and the scope of the exclusive rights granted under copyright law can generally be defined in the context of a legal ontology, the object of the copyright can better be described within an ontological framework that pertains to the realm of information content. Likewise, while the rights and obligations assigned under the terms and conditions of a copyright license necessarily belong to the realm of copyright and contract law, the actual object of these rights ultimately relates to the domain of information.

The concept of ‘information’ can be analyzed through the work of Roman Ingarden, a 20th century philosopher with a strong interest in aesthetics who studied under the supervision of Husserl. Ingarden undertook a comprehensive analysis of the structure assumed by original works of authorship from an ontological perspective with particular focus on the literary work of art. In his analysis, Ingarden identifies the essential features that define a literary work, its constitutive parts and the way in which they are related to each other. In particular, while he refused to classify the literary work of art as either a real object or an ideal object, Ingarden conceived the literary work as a stratified formation composed of four different layers: (1) the layer of signs - e.g. signs, symbols, phonetic formations, etc; (2) the layer of semantic units - e.g. words, sentences, paragraphs, etc; (3) the layer of schematized aspects - e.g. the interpretation of these semantic units by the reader, and (4) the layer of the represented entities themselves.⁴⁰⁸ Every layer does not subsist by itself but rather contribute to forming the work as a whole, whose value ultimately depends upon the interrelation amongst its constitutive elements. Yet, despite the considerable impact it had on literary theory, Ingarden’s model is impractical from analytical standpoint because it is limited to the realm of literature.

⁴⁰⁷ With the advent of the information society and the recent deployment of the semantic web, legal ontologies are assuming increasingly significant role in the representation, the processing and the retrieval of legal information. For a general overview legal ontologies in different realm of knowledge, see SARTOR, G., CASANOVAS, P., BIASIOTTI, M. & FERNANDEZS-BARRERA, M. (2011) *Approaches to Legal Ontologies*.

⁴⁰⁸ Renowned for his research on aesthetics and for his ontological analysis of cultural objects, Ingarden investigated the structure of the literary work of art both from a structural and ontological perspective, to conclude that the work does not as such exists only at the physical level, but is composed of a number of layers (i.e. signs, semantic units, schematized aspects and represented entities) that eventually give a meaning to the literary work as a result of every individual interpretation of their forms and semantics. See, in particular, INGARDEN, R. & GRABWICZ, G. G. (1973) *The Literary Work of Art: An Investigation of the Borderlines of Ontology, Logic and the Theory of Language*, Northwestern University Press.

Even though he eventually engaged into the ontological analysis of different types of works (such as music, paintings, and architecture)⁴⁰⁹ in order to determine their ontological status, their constitutive parts, and their relationships with other entities, the analysis remained specific to that particular work in question. Ingarden did not produce a comprehensive model which could potentially accommodate the work of art in all its manners and forms (such as music, dance, visual arts, and so forth). Most importantly, because of the early age of his works, in all of his approaches, Ingarden failed to provide an account of the nature of digital works. Accordingly, in spite of its relevance in the realm of philosophy, Ingarden's framework cannot qualify as the main basis of analysis to identify the various components of a work in the digital environment, or even just to determine the actual level of protection they are provided with. Alternative approaches may therefore have to be considered in order to achieve a proper ontological analysis of copyright works that would be applicable both in the physical and digital world.

With the advent of Internet and digital technologies, a new trend towards the dissemination, multiplication and diversification of information has begun. Because of the very nature of information, the same piece of content can exist simultaneously at different places and in different formats. Besides, ever since electronic publishing has become standard practice, information is no longer subject to the standard restrictions imposed by physical media. Information can now be edited, revised, or otherwise modified more easily than its physical counterpart, and the resulting arrangement can be published on the Internet where it is immediately available to the public on a worldwide scale.

Overall, the deployment of digital technologies has basically resulted into two divergent outcomes. On the one hand, as both the quantity and the variety of published material continue to grow over the years, keeping track of the different publications available and of their respective versions and editions has become increasingly difficult. On the other hand, the advent of digital technologies has produced new opportunities for the development of better information systems based on the automatic processing of data in electronic databases.

Over the years, a variety of schemas have been developed for the purpose of facilitating the identification and the categorization of different types of information under a common framework of analysis.

In particular, a series of cataloguing standards have been deployed to simplify the making and the maintenance of extensive databases of information and bibliographic records,⁴¹⁰ the most significant of which are probably the Paris principles of 1961 and the ISBDs (International Standard for the Bibliographic Description of monographic publications) of 1971.

In spite of their merits in the identification and classification of certain pieces of information, these standards are however unable to provide an accurate definition of what constitutes information from a more generic

⁴⁰⁹ See e.g. the various ontological models provided for in the three essays "The Musical Work", "The Picture", "The Architectural Work" and "The Film" in INGARDEN, R. (1989) *The Ontology of the Work of Art*, Ohio University Press.

⁴¹⁰ See e.g. the Paris Principles of 1961 and the International Standard Bibliographic Description for Monographic Publications (ISBDs) of 1971 which have been subsequently employed as the foundation for the development of a variety of new and revised standards for bibliographic description at national and international level. For more details, see TILLET, B. B. (2009) *International Cataloguing Principles (ICP) Report*. *World Library and Information Congress*. Milan, Italy.

layer of abstraction. For this reason, a different set of frameworks have progressively emerged in the context of various information management systems, with the intention of providing a more comprehensive analysis of the different elements that constitute information.

For instance, the XOBIS (XML Organic Bibliographic Information Schema) is a classification schema that has been developed as a potential foundation for future access to information in the digital environment. Not only does it attempt to provide a detailed account of any information object, but it also provides an overview of the informational background of that object - such as, e.g. the author, title and subject matter thereof. For this purpose, the structure of the XOBIS has been made to comprise a set of 10 fundamental categories which can be used to describe the characteristics of any given piece of content, as well as to identify the different versions and corresponding instances thereof.⁴¹¹ Yet, being the XOBIS framework for the most part concerned with the description of the distinctive properties and attributes of various pieces of information, it is however incapable of properly identifying the various elements that constitute the information content as such.

More directly related to the ontological realm is the CIDOC Conceptual Reference Model (CRM), a specialized framework developed by ICOM CIDOC (International Council of Museums – International Committee for Documentation) which was conceived to describe the concepts and relationships that subsist within the realm of cultural heritage documentation. As such, it provides a general ontological framework that can accommodate any information that relates to cultural heritage – regardless of their type (e.g. textual, audiovisual, etc) and irrespectively of their source (e.g. museums, libraries, archives, etc). The main function of the CIDOC CRM is to serve as a basis to create a common and shared understanding of all cultural heritage information that has been made available through a variety of different sources.⁴¹² Accordingly, in spite of its limited scope, the CIDOC CRM nonetheless qualifies as a valuable tool for the description and identification of concepts pertaining to the realm of cultural heritage because it allows for these concepts to be defined by means of a standardized set of formal semantics.

⁴¹¹ XOBIS is an XML schema that purports to reorganize bibliographic records and authority data elements into a single and integrated structure. The purpose is to produce a particular set of metadata that can be used in order to link a particular piece of content together with the corresponding properties and attributes thereof, so as to eventually constitute a potential foundation for future access to information in a distributed digital environment. In particular, in order to provide a simple and reliable framework to improve information retrieval and current processing functionalities, the XOBIS identifies a series of 10 fundamental categories of information that can be linked to any other entity in order to characterize a particular work of authorship. By identifying the relationships that subsist between the work and the informational context it belongs to, XOBIS allows for the potential identification of the various components of a work and the corresponding versions thereof. For more details, see e.g. MILLER, D. R. (2003) XOBIS - an Experimental Schema for Unifying Bibliographic and Authority Records. *Cataloging & Classification Quarterly*.

⁴¹² The scope of the CIDOC CRM fundamentally comprises any information that is required for the scientific documentation of cultural heritage. In this sense, cultural heritage is meant to encompass all types of material that is exhibited in the context of museums and related institutions, which includes any collection, site or monument relating to natural history, ethnography, archaeology, historic monuments, as well as collections of fine and applied arts. The goal of the CIDOC CRM is to serve as a guide for the conceptual modeling of information in order to enhance the accessibility of cultural heritage information and to promote the exchange of information through the integration of resources that derive from heterogeneous sources. For a more detailed overview, see <http://cidoc.ics.forth.gr/>

Alternatively, in order to facilitate the storage and retrieval bibliographic information, the International Federation of Library Associations and Institutions (IFLA) initiated the development of the Functional Requirements for Bibliographic Records (FRBR), which basically qualifies as taxonomical structure for the identification and the classification of bibliographical data and other library materials. The FRBR consist of a clearly defined and structured framework to archive and organize data recorded in bibliographic records according to the specific needs of users. It provides a clear, precise and common understanding of the nature and the function of bibliographic records in order to promote the development of a common framework for bibliographic metadata.⁴¹³ As opposed to the CIDOC CRM, however, the FRBR is not concerned with cultural heritage documentation provided by museums or other cultural institutions, but only with these entities which are used in the context of library catalogues and national bibliographies.

In spite of their divergences in scope, the CIDOC CRM and the FRBR have subsequently been brought together under the framework of the FRBRoo,⁴¹⁴ under the assumption that the library and the museum communities would eventually benefit from harmonizing their conceptual models. Accordingly, the FRBRoo has been developed with the intention of providing a common ontological framework capable of representing the underlying semantics of bibliographic data, regardless of whether it belongs to a library or a museum. Its goal is to achieve a common representation of cultural information in order to facilitate the integration and to promote the exchange of bibliographic and museum information.⁴¹⁵

More recently, a series of specialized ontologies have been developed in various sectors of activity in order to provide a formal conceptualization of different domains of reality. In particular, albeit initially confined to the biomedical domain, the Information Artifact Ontology (IAO)⁴¹⁶ has been conceived as a specific branch of the

⁴¹³ For more details on the FRBR, see <http://www.ifla.org/en/publications/functional-requirements-for-bibliographic-records>

⁴¹⁴ The FRBRoo (Object Oriented FRBR) is an initiative that results from the joint effort of the CIDOC CRM and the FRBR working groups. As such, the FRBRoo purports to establish “a formal ontology intended to capture and represent the underlying semantics of bibliographic information and to facilitate the integration, mediation and interchange of bibliographic and museum information”. In order to provide semantic interoperability between the frameworks used for library and museum documentation, the FRBRoo reformulates the same concepts expressed within the FRBR as an extension of the CIDOC CRM model. The goal is to harmonize the FRBR with the CIDOC reference model in order to improve the interoperability of digital libraries and museum information management systems. For more details on the implementation of the FRBRoo, see IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization.

⁴¹⁵ Both libraries and museums are intended to preserve assets that belong to the cultural heritage and any valuable information that relates to these assets. As such, the distinction between the assets that should belong to a library or a museum can sometimes be difficult to establish, as both may often be concerned with the same subject matter. Given the comparable qualities of these assets, a common conceptualization of any cultural heritage information gathered by these two types of institutions would therefore be valuable insofar as it would increase the interoperability and the exchange of information amongst them. See Ibid.

⁴¹⁶ The Information Artifacts Ontology (IAO) was originally conceived as part of the Ontology for Biomedical Investigations (OBI) but has subsequently evolved into an independent ontology with its own set of rules and principles that purports to accomplish a proper formalization of any concept related to the realm of information artifacts and their corresponding relationships with the world. A complete overview of the Information Artifact Ontology (IAO), including its actual structure and source code can be found at <http://code.google.com/p/information-artifact-ontology>.

Ontology for Biomedical Investigation (OBI) which was specifically meant to deal with information artifacts and information content. Originally concerned exclusively with information provided in the context of biomedical investigations, the IAO progressively evolved into an independent ontological framework that could eventually be employed to identify any information entity that subsists within a particular portion of reality, provided that it fulfills all the conditions for it to qualify as an information artifact.

On the whole, the greater variety and growing diversity of information resulting from the advent of digital technologies has led to the emergence of various ontologies concerned with the formal representation of different types of information and the analysis of their distinctive attributes and properties. Although they have been developed for different fields of applications, their structure is often generic enough for them to be employed, by analogy, in contexts other than those for which they have been originally conceived. As such, while none of these frameworks were intended to be used in the context of copyright law, their general terminology could nonetheless be employed as a basis for the drafting and the interpretation of the various terms and conditions of a copyright license.

In particular, in view of their focus on the different components of information and on the various relationships they entertain with each other or with other pieces of information, both the Functional Requirements for Bibliographic Records and the Information Artifact Ontology could assume a significant role in the context of copyright licensing – although their structure may require a number revisions in order to comply with the most recent developments of digital technologies.

THE FRBR APPROACH

As previously mentioned, with the dramatic increase in the amount of information that has become available in the information society, a need has emerged for society to archive and organize information according to a set of established standards and principles that would allow for every piece of information to be identified and retrieved by anyone in a consistent manner.

In 1998, the International Federation of Library Associations and Institutions (IFLA) released a set of Functional Requirements for Bibliographic Records (the FRBR framework)⁴¹⁷ with the purpose of achieving an easier identification and a more precise representation of the different elements that constitute a bibliographic work. Although specifically designed for bibliographical records, the particular framework elaborated by the FRBR can also be used in order to describe and to analyze the various components of a piece of authorship that constitute the subject matter of copyright law.

The FRBR framework identifies the various elements that are being commonly referred to in bibliographic records. In order to do so, it distinguishes between three categories of entities: (1) the actual products of artistic endeavor, such as the work, the expression of the work, the manifestation and the physical item; (2) the various stakeholders involved with such products; and (3) any additional attributes that are necessary to properly describe these products.⁴¹⁸ Finally, in order to provide a more detailed description of these respective products, the FRBR also goes on to identify the different relationships that every one of these entities entertains with each other.

While they are all necessary to provide an accurate description of bibliographic works, the first category is definitely the most useful to describe the constitutive elements of an original work of authorship for the purposes of copyright law. In particular, the FRBR framework subdivides a work into four different layers: the work as an abstract intellectual creation (hereinafter the *work_t*), the expression as a particular articulation of

⁴¹⁷ The International Federation of Library Associations and Institutions (IFLA) is an international body that represents the interests of libraries and other institutions involved with the provision of information. The Functional Requirements for Bibliographic Records (FRBR) is particular framework endorsed by the IFLA and intended to provide a clear, precisely stated and commonly shared understanding of the nature and purpose of bibliographic records, for the future development of a common framework for bibliographic metadata. More precisely, the goal of the FRBR is to provide a clearly defined and structured framework to archive and organize the data recorded in bibliographic records to better satisfy the needs of users. For more details on the FRBR, see <http://www.ifla.org/en/publications/functional-requirements-for-bibliographic-records>

⁴¹⁸ The FRBR defines a number of entities which are intended to represent the main object of interest of bibliographic data. A first group of entities comprises the different aspects of a work that are usually described in bibliographic records: e.g. the work, the expression, the manifestation and the item. A second group of entities represents the agents (e.g. a person or a corporate body) that are somehow involved with the work, e.g. because they are responsible for its production, its dissemination or its protection. Finally, a third group of entities regroups any additional entity that serves to describe the subject of the work: e.g. the concept or the object of work, or the context of the work: e.g. a particular event or place. See IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

the work (hereinafter the *expression_t*), the manifestation as a specific embodiment of the expression into a medium (hereinafter the *manifestation_t*) and the item as a single exemplar of the manifestation (hereinafter the *item_t*).⁴¹⁹ Each one of these entities has to be individually and separately identified, in that they each play a different role in the process of identifying a particular piece of information. Indeed, while both the *work_t* and the *expression_t* fundamentally refer to the intellectual content a work, the *manifestation_t* and the *item_t* into which they has been embodied are ultimately concerned with the physical representation of that work.

In view of the different roles they assume, the entities representing the various aspects of a work are assigned different properties according to their type. For instance, in the case of literary works, the *work_t* may be of a particular genre (e.g. fiction, romance, autobiography), whereas the *expression_t* may have been expressed in a particular language and incorporated into a *manifestation_t* that may feature a particular kind of typeface. Moreover, the *item_t* into which the work has been incorporated may reflect different physical conditions (e.g. new or used).⁴²⁰ Each attributes is specifically related to one particular type of entity and would be meaningless if applied to a different category (e.g. the *work_t* does not have a language, the *item_t* does not have a genre).

Therefore, as a general rule, in order to perform the analysis of any given work of authorship, the general concept of the *work_t* is to be distinguished from the *expression_t* it has been articulated into and the *manifestation_t* of that *expression_t* in a particular medium of expression is to be discerned from the physical *item_t* into which it is actually being conveyed to the public.

In this regard, by allowing for the classification of concepts ranging from the *work_t* as a general concept to the physical *items_t* into which the work has been incorporated, the FRBR establishes a framework that incorporates a series of abstractions ranging from the more general to the specific.

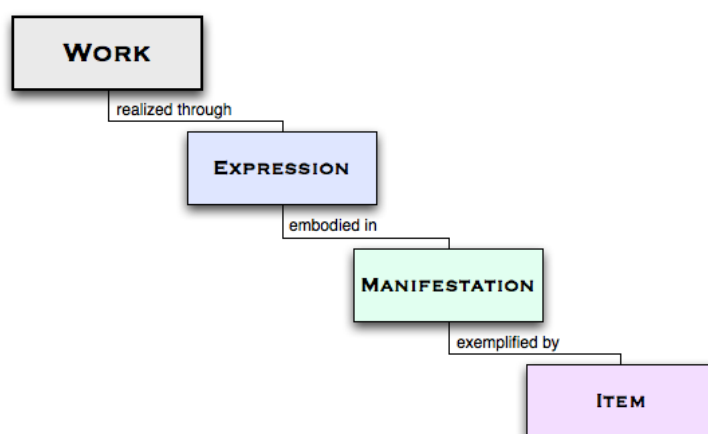
Accordingly, in spite of the overall simplicity of its structure, to the extent that it establishes a standard terminological framework for bibliographic records capable of illustrating the relationships they entertain with each other and with other kinds of entities, the FRBR could theoretically be regarded as an ontology in its own right.

⁴¹⁹ The *work_t*, the *expression_t*, the *manifestation_t* and the *item_t* constitute the basic entities of the Functional Requirement for Bibliographic Records (FRBR) model when it comes to the description of a work. These four entities constitute different elements of a work and they purport to represent the various aspects of the work that are of highest interest to the users of bibliographic records and which are therefore necessary to be identified as distinct and separate entities. See Ibid.

⁴²⁰ The *work_t*, the *expression_t*, the *manifestation_t* and the *item_t* are separate entities which represent the distinct constitutive elements of a work, each of which may feature different attributes according to their own characteristics (e.g. the *item_t* as a physical entity does not share the same characteristics as the *work_t*, the *expression_t* or the *manifestation_t* which are essentially abstract) and functions. For instance, the name of the authors, the genre and the title of a work are attributes which generally belong to the *work_t*. The name of any translator or adaptor, the form and the length of a work generally belong to the *expression_t*, whereas the name of the publisher, the date and the place of publication naturally belong to the *manifestation_t*. See CARLYLE, A. (2006) Understanding FRBR as a Conceptual Model: FRBR and the Bibliographic Universe. *Resources and Technical Services*, 50, 264-273.

THE CONSTITUTIVE ELEMENTS OF A WORK

For the purposes of the FRBR, every work of authorship is composed of four different layers of abstraction: (1) the *work_t*, (2) the *expression_t*, (3) the *manifestation_t* and (4) the *item_t*, where the *item_t* constitutes the only tangible entity that can be observed in the real world. Conversely, the *work_t*, the *expression_t* and the *manifestation_t* of the work are abstract entities which are inherently intangible and, as such, are not readily identifiable in the physical world. Yet, while the *expression_t* and the *manifestation_t* have a relatively well recognizable structure, the *work_t* constitutes a purely abstract concept whose identity cannot easily be established.



Any work that exists in the world necessarily incorporates these four layers, all of which are inherently dependent upon each other - in the sense that one cannot exist without the others.

Indeed, with the exception of the *item_t*, the different elements of a work may only come into being after they have been articulated into the subsequent layers of abstraction. On the one hand, the *work_t* emerges from the articulation of an idea into a particular form of expression. On the other hand, the *expression_t* of a work must be embodied into a particular medium according to a *manifestation_t*, which is ultimately defined by the physical *item_t* incorporating the work.⁴²¹ Accordingly, while the *work_t* is articulated into a particular set of signs or symbols which constitute one possible *expression_t* of the *work_t*, the *expression_t* must subsequently be embodied into a particular medium according to a format which represents a particular *manifestation_t* of that *expression_t*. Finally, the *manifestation_t* is exemplified into the physical world by means of a tangible *item_t* which fundamentally represents the manner in which the work is being conveyed to the public.

⁴²¹ The concept of a work can only be identified after it has first been expressed into a particular manner. Similarly, the expression itself can only be perceived once it has been manifested into a particular medium of expression, and, likewise, the manifestation of the work may only be established if it has been incorporated into a physical item (which may include the human brain). Indeed, “there is no such thing as an expression that is not embodied, a work that is not realized, etc.” See, BOER, A. & VITALI, F. (2007) *MetaLEX. CEN Workshop*. Leiden, the Netherlands.

The relationship that subsists between the different layers of a work is such that every layer either incorporates or is incorporated into another layer of the work. More precisely, the relationship amongst the constitutive elements of a work is unequivocal from a bottom-up approach: every *item_t* exemplifies one particular *manifestation_t*, which in turns embodies one particular *expression_t*, which ultimately articulates one and only one *work_t*. As a result, the *item_t* alone - as well as the *manifestation_t* or the *expression_t* alone - can be used to indirectly identify any other element of the work which is located at a higher level of abstraction.⁴²² However, the inverse relation does not necessarily hold. A *work_t* can be articulated into a multitude of *expressions_t*, which can be embodied into a variety of *manifestations_t*, which can in turn be incorporated into an indefinite number of *items_t*.

Accordingly, while the relationship that subsists between the constitutive elements of a work can be specific to one entity (e.g. the *expression_t* of a *work_t* is specifically dependent upon the *work_t* it articulates and cannot exist without it), they are often of a more generic nature. While an entity may depend upon the subsistence of another entity to exist, it is not specifically related to it (e.g. the *manifestation_t* of a *work_t* necessarily has to be incorporated into a physical *item_t*, but it is not specific to that *item_t* and will therefore subsist as long as there remain at least one instance of that *manifestation_t* in the world).

Before addressing the interaction that exists between the different layers of a work and their corresponding relationship with the copyright regime, it is necessary to provide a detailed overview of every entity that constitutes an original work of authorship.

A. THE WORK

Within the framework of the FRBR, the *work_t* represents the fundamental ideas underlying any original work of authorship. The notion of the *work_t* ultimately refers to an abstract entity, which constitutes a distinct intellectual or artistic creation. As such, the *work_t* is to be distinguished from both the physical medium in which it is conveyed to the public and the actual content thereof.⁴²³

⁴²² The different layers that constitute a work of authorship are organized into a particular structure: the *work_t* is located at the higher layer of abstraction, followed by the *expression_t*, the *manifestation_t*, and finally the *item_t* which resides at the lowest layer of abstraction. As such, an *item_t* is exclusively related to one *manifestation_t*, which is explicitly related to one particular *expression_t*, which itself is unambiguously related to only one *work_t*. Accordingly, for any given element of a work, it is always possible to go up in the level of abstraction in order to establish the identity of the upper layers it relates to. See e.g. TILLET, B. B. FRBR and RDA: Resource Description and Access. IN TAYLOR, A. (Ed.) *Understanding FRBR: What It Is and How it Will Affect Our Retrieval Tools*.

⁴²³ Seymour Lubetzky (1898-2003), one of the most prominent cataloging theorists of the twentieth century, has been investigating the theoretical foundations underlying the organization of knowledge in order to develop a set of rules that would allow for a more efficient categorization of data. He elaborated a series of fundamental principles concerning the description of information goods and the distinction between the work and its physical representation is probably one of his most significant contributions to modern cataloging techniques. In particular, Lubetzky introduced the idea that a work of authorship can only be defined as a general concept or idea. The work as an abstract intellectual entity has no physical subsistence and it is therefore imperative that the work be distinguished from the physical items which are mere representations of the work. "The book [...] comes into being as a dichotomic

On the one hand, to the extent that it can only be defined as a general concept or idea, the work_t is an abstract entity which does not enjoy any physical subsistence *per se*. It is therefore imperative that the work_t be distinguished from the physical item_t which is a mere representation of that work_t.⁴²⁴ This distinction is closely related to the traditional container/content polysemy identified by Nunberg, according to which a ‘document’, defined as a particular body of information (e.g. the intellectual or artistic content of a work), should be distinguished from the physical ‘document’ into which that particular body of information has been incorporated (e.g. the physical copy of the work as a container of information).⁴²⁵

On the other hand, the concept of the work_t is to be distinguished from the content which has been incorporated into the physical representation of the work. Given that it is only concerned with a series of general concepts and ideas, the work_t can be articulated into a variety of different expressions_t, which, in spite of their differences, all constitute a possible articulation of the very same work_t. As such, the actual scope of a work_t is fundamentally variable over time. The work_t as it was initially conceived may subsequently develop, building upon the contributions of an indefinite number of authors. Different variants of

product — as a *material* object or medium used to convey the *intellectual* work of an author. Because the material *book* embodies and represents the intellectual *work*, the two have come to be confused, and the terms are synonymously used.” LUBETZKY, S. (1969) Principles of Cataloging. Final Report. Phase I: Descriptive Cataloging. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited. Lubetzky suggests that a proper cataloging technique “presupposes recognition of the fact [...] that the materials of a library — books, manuscripts, phono-records, etc. — are *representations* of the works of authors, not the works themselves.” LUBETZKY, S. (1961) The Function of the Main Entry in Alphabetical Catalogue - One Approach. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited, LUBETZKY, S. (1969) Principles of Cataloging. Final Report. Phase I: Descriptive Cataloging. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited.

⁴²⁴ “The book [...] comes into being as a dichotomic product — as a *material* object or medium used to convey the *intellectual* work of an author. Because the material *book* embodies and represents the intellectual *work*, the two have come to be confused, and the terms are synonymously used.” LUBETZKY, S. (1969) Principles of Cataloging. Final Report. Phase I: Descriptive Cataloging. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited. Lubetzky suggests that a proper cataloging technique “presupposes recognition of the fact [...] that the materials of a library — books, manuscripts, phono-records, etc. — are *representations* of the works of authors, not the works themselves.” LUBETZKY, S. (1961) The Function of the Main Entry in Alphabetical Catalogue - One Approach. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited, LUBETZKY, S. (1969) Principles of Cataloging. Final Report. Phase I: Descriptive Cataloging. IN SVENONIUS, E. & MCGARRY, D. (Eds.) *Seymour Lubetzky: Writings on the Classical Art of Cataloging*. Englewood, CO, Libraries Unlimited.

⁴²⁵ Nunberg elaborated the container/contents polysemy in order to illustrate certain ambiguities of language by showing how a single word may bear different but nonetheless related meanings according to the context in which it is being used: e.g. “I drank the bottle of whisky” (where the word “bottle” refers to its content), versus “I broke the bottle of whisky” (where the word “bottle” refers this time to the container). The word “document” exhibits a similar pattern of polysemy, as it may assume different meanings according to the context in which it is being employed, e.g. the word “document” in “I have read this document” refers to the content, whereas in “I have submitted the necessary document” the “document” refers to the container. For more details on the container/contents polysemy, see NUNBERG, G. D. (1979) The non-uniqueness of semantic solutions: polysemy. *Linguistics and Philosophy*, 3, 143-184.

a work, such as revisions, additions, or translations, do not amount to a separate work_t but merely qualify as alternative expressions_t of the same work_t.⁴²⁶

In addition, a work_t may be articulated as an aggregation of component works_t. A distinction must therefore be made between individual works_t, which can only be articulated into a single self-contained expression_t, and aggregation works_t, which are made up of a number of elements that may themselves qualify as either individual or aggregation works_t.⁴²⁷ For instance, an anthology of literary works is an aggregation work_t whose underlying idea consists in the conceptual assortment of selected works.

The work_t is therefore an entity which can be articulated into an indefinite number of expressions_t – regardless of the nature or form it may assume. As a general rule, therefore, equivalence at the level of the work_t can be established whenever different expressions_t incorporate the same underlying ideas and constitute an articulation of the same general concept of the work_t. Conversely, equivalence does not require equality at any lower layer of abstraction. Indeed, it is often the case that different instances of a work feature a completely different expression_t or manifestation_t but nonetheless refer to the same general concept of the work_t.

In this regard, it may sometimes be difficult to determine whether different entities should actually be considered as different expressions_t of the very same work_t, or whether they should rather be regarded as the expression_t of a series of different and yet relatively similar works_t. Indeed, in view of the abstract and intangible nature of the work_t, properly establishing the boundaries of each work_t as a separate entity is likely to be challenging.⁴²⁸

⁴²⁶ Elaine Svenonius, Professor at the UCLA Department of Information studies, as well as a major contributor to the field of information organization and cataloging, defines a work as "the set of all documents that are copies of (equivalent to) a particular document (an individual document chosen as emblematic of the work, normally its first instance) or related to this individual by revision, update, abridgment, enlargement, or translation." SVENONIUS, E. (2000) *The Intellectual Foundations of Information Organization*, Cambridge, MA, MIT Press.

⁴²⁷ For the purpose of the FRBROO (object oriented Functional Requirements for Bibliographic Records), there exists different types of works_t, such as (1) individual works_t, which can be expressed in a single self-contained expression; (2) aggregation works_t, which can only be expressed as a series of individual and/or aggregation works_t. The category of aggregation works_t comprises works_t whose essence is the selection and/or arrangement of expressions_t of other works_t. Accordingly, the relation of an entity to an aggregation work_t should only depend on whether that particular entity expresses the same general concept, and should not be confused with the structural parts of the expression_t that has been taken from other works. IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization.

⁴²⁸ The work_t as an entity refers to the abstract dimension of a particular work of authorship. The work_t is regarded as a universal entity which can be realized into an indefinite number of instances with different characteristics of content and form. Every instance constitutes a possible representation of the same work_t insofar as they all convey the same general concept. The main problem is that of identifying the actual boundaries of a work_t in order to be able to determine whether or not the concept conveyed by any given instance is sufficiently different from the general concept of a work_t so as to no longer be regarded as a particular instance of that work_t. For a more detailed analysis of the various problems related to the identification of a work as a universal concept, see HICK, D. H. (2008) *The Metaphysics and Ethics of Copyright*. Department of Philosophy. University of Maryland.

Given its conceptual character, in fact, it is often difficult to distinguish between one work_t and another, or even just to determine the whole set of expressions_t that belong to one work_t. The problem with the identification of the work_t is that it is ultimately an arbitrary task. To the extent that it does not qualify as a physical entity with an identity of its own, establishing the identity of a work_t will always and necessarily be subject to a degree of uncertainty. The boundaries between one work_t and another are arbitrary and necessarily depend upon the nature of the work, the anticipated need of users, as well as on a series of other subjective considerations.⁴²⁹

Besides, while it can generally be identified by the way in which it has been expressed, the concept of a work_t only subsists in the commonality that can be observed amongst the different expressions_t.⁴³⁰ From a functional point of view, therefore, the work_t is only useful for the purposes of categorization. Its main function is to gather together a multitude of expressions_t under a common umbrella. As a result, the boundaries of a work_t are therefore likely to grow over time, as new expressions_t and new derivative works_t are produced.⁴³¹

In view of its intrinsically immaterial nature, the work_t fundamentally qualifies as an intangible entity which cannot as such be affected by the advent of digital technologies. Indeed, the work_t essentially amounts to an abstract entity that does not discriminate between the digital and the physical environment. Situated at the highest level of abstraction, the work_t is the only constitutive element of a work which subsists regardless on the environment it is in. No matter how structured or detailed an idea is, as long as it remains of a purely conceptual nature, the general concept of the work_t will always constitute an autonomous entity which exists exclusively in the realm of the intellect. As such, it is independent from both the content and the format in which it has been encoded, as well as from the actual medium of expression through which it is being conveyed to the public. The definition of the work_t can therefore be employed interchangeably to identify both physical and digital works.

⁴²⁹ The subjectivity involved in the process of distinguishing between one expression_t and another have been expressly acknowledged by the FRBR, which recognizes that, although any change in the content would automatically generate a new expression_t, no matter how minor the modification may be, at least on a practical level, the degree to which bibliographic distinctions are made between the variants of a work will fundamentally depend on the nature of the work itself, on the anticipated needs of users and on the ultimate discretion of the cataloger. See IFLA (1998) *Functional Requirements for Bibliographic Records*. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

⁴³⁰ Specifically, according to the FRBR, “a work is an abstract entity; there is no single material object one can point to as the work. We recognize the work through individual realizations or expressions of the work, but the work itself exists only in the commonality of content between and among the various expressions of the work.” See *Ibid*.

⁴³¹ A work_t is essentially an entity that comprises a set of expressions_t which are linked together for the fact that they all contribute to shaping the identity of one work_t. Accordingly, to the extent that the alteration of one particular expression_t (e.g. as a result of revisions, editions, translations) preserves the identity of the original work, the resulting expression_t will not produce a new work_t but will merely be regarded as a different articulation of the same work_t. Although the identity of the work_t will remain the same, its boundaries will necessarily grow as a result of the incorporation of a new expression into the overall scope of the work. Defining the boundaries of a work_t is therefore a relatively complex task which has to be constantly revised, in particular, when it comes to defining the boundaries of a serial work_t (e.g. a journal or magazine), the scope of which is specifically intended to grow over time. For more details, see ANTELMAN, K. (2005) *Identifying the Serial Work as a Bibliographic Entity*. *Library Resources and Technical Services*, 48.

Accordingly, assuming that a significant degree of similarity can be observed, the work_t as it has been defined by the FRBR does not preclude the possibility for the same work_t to be incorporated both in a physical medium and in a digital medium.

B. THE EXPRESSION

From a legal standpoint, the expression is the fundamental aspect of a work that is protected by copyright law. Indeed, given that the copyright regime does not protect the work as general concept, but only the way in which it has been expressed, the expression is the basic layer of abstraction that is eligible for copyright protection. A proper definition of the term is therefore crucial not only in the context of bibliographical records but also for the purposes of copyright law.

Within the FRBR framework, the expression_t essentially represents the specific intellectual or artistic form taken by a work_t after it has been realized into a particular form of expression.⁴³² As such, it amounts to a relatively more concrete entity than the work_t itself, but nevertheless consists of purely intangible content. More precisely, the expression_t ensues from the concretization of the conceptual idea of the work_t into a particular entity with an objectively recognizable structure. It basically represents the articulation of a work_t into a particular medium of expression by way of a specific arrangement of signs, which may assume a variety of forms (such as, e.g. alphanumeric or musical notation, sounds, images, movements, etc - or a particular combination thereof).⁴³³

Any given work of authorship may have an indefinite number of expressions_t, which might be derived either directly from the original work_t or indirectly from a derived work_t (in which case the new expression_t may contain parts of the expression_t of the derived work_t). In addition, specific categories of works can only be expressed by borrowing the expression of other works (e.g. in the case of compilations, databases, etc). With reference to the anthology of literary works, for instance, the expression of the aggregate work_t would comprise not only the particular assortment of works_t, but also the expressions_t pertaining to each one of the selected works_t.

Albeit intangible in character, the expression_t cannot subsist independently of any physical medium. Indeed, the expression of any abstract idea fundamentally consists of a particular arrangement of signs which necessarily

⁴³²According to the FRBR, the expression_t is “the intellectual or artistic realization of a work in the form of alphanumeric, musical, or choreographic notation, sound, image, object, movement, etc., or any combination of such forms.” It comprises, for example, “the specific words, sentences, paragraphs, etc. that result from the realization of a work in the form of a text, or the particular notes, phrasing, etc. resulting from the realization of a musical work.” See IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

⁴³³ An expression_t subsists in the specific intellectual or artistic form that any work_t may take every time it is being expressed. If a work_t has been expressed into a text, the expression_t will thus refer to the specific words, sentences, and paragraphs that constitute that text, whereas, if the work_t has been expressed into music, the expression_t will refer to the particular notes that constitute the melody. Ibid.

requires a medium on which it can be formulated (where the human brain qualifies as a medium for human memory).

Yet, while it necessarily accounts for the way in which the general concept of the work can be communicated to the public (e.g. by means of literary materials, audiovisual elements or dramatic performances), it does not take any account of the different media on which it may be conveyed to the public. Indeed, the *expression_t* is exclusively concerned with the conceptual arrangement of that particular set of signs and symbols that constitute the content of the *work_t* and therefore does not relate to the way in which that content might eventually be incorporated into a particular medium of expression.

Once it has been produced, the *expression_t* exists independently from the physical medium into which it has been originally expressed. Although inherently connected to a particular form of expression (i.e. the *expression_t* of a literary work is necessarily of a literary nature), the *expression_t* is not confined to any specific medium of expression. Provided that they constitute a similar medium of expression, the *expression_t* of a *work_t* may therefore exist simultaneously on more than one carrier.

Although morphologically distinct, different *expressions_t* are related to each other on the basis of a common conceptual foundation. Each represents a different form under which the *work_t* has been articulated and any change in the explicit content thereof would necessarily constitute a new and distinct *expression_t*. The various *expressions_t* of a *work_t* are generally easy to distinguish from each other because their identification is based on a series of observable factors which can be objectively assessed (e.g. a particular combination of signs, a particular arrangement of notes, etc). Conversely, changes concerning the style or the manner in which the sequence of symbols constituting the *expression_t* are presented would not amount to an additional *expression_t* but merely to a new *manifestation_t* thereof. The reason is that the *expression_t* excludes from its definition anything that is related exclusively to the physical representation of the work and does not as such constitute an integral part of the *expression_t*.

As such, its definition is unlikely to be affected by the specificities of the digital environment. Just like the *work_t*, the *expression_t* subsists at such a layer of abstraction that it does not actually matter whether it has been embodied into a physical or a digital medium. Given its conceptual character, the way in which the *expression_t* has been defined in the FRBR framework is likely to apply both in the physical and the digital environment, without any necessary revision to be made.

As a general rule, in fact, provided that they are made of an identical set of symbols, sounds or signs organized and/or communicated in an identical manner, different instances of a work will be regarded as embodying the very same *expression_t* regardless of whether they subsist in the physical or in the digital environment.

Determining the identity of the *expression_t* as a separate entity is generally easier and less arbitrary than determining the identity of the *work_t*, although it may nonetheless require some sort of discretionary judgment.⁴³⁴ Indeed, given that what is actually integral to the artistic or intellectual realization of a *work_t* is

⁴³⁴ Whether the change constitutes a new *expression_t* or a new *manifestation_t* depends on the nature of the *work_t* and on the type of modification the *expression_t* has been subject to. Where the elements affected are not a distinctive feature of the *expression_t* (e.g. the typeface or the page layout of a literary work), the change will only generate a new *manifestation_t* of the same *expression_t*, whereas the alteration of essential elements (e.g. the typeface or the page layout of a graphical design) will generate a

not necessarily possible to determine on an objective basis, in certain circumstances, it may sometimes be difficult even for a human being to determine whether or not different instances of a work actually incorporate the same expression_t.⁴³⁵

Another problem relates to the fact that, according to the provisions of copyright law, perfect identity between the different expressions_t of a work is not necessarily required in order to determine copyright infringement. In many cases, in fact, substantial similarity is enough to trigger a cause of action for copyright infringement to the extent that it can be supported with proper evidence that copying has actually been taking place.⁴³⁶ Hence, provided that different expressions_t can be considered equivalent even though they actually exhibit a certain level of dissimilarities, assessing equivalence between the different expressions_t is a process which inevitably involves subjectivity.

This is particularly relevant in the digital environment, where both the malleability and interactivity of digital media has led to the proliferation of many expressions_t of the same work_t that only distinguish themselves with regard to a series of minimal variations. Indeed, it is often the case in the digital realm that the expression_t of a digital work is being constantly updated or revised through the introduction of a series of small but progressive revisions to the actual content thereof. In particular, given that they are not bound to any of the physical constraints that characterize the format of most physical works, the content of digital works has become inherently dynamic.

On the one hand, many digital works (e.g. Internet websites or blogs) are actually created with the intention of being subsequently updated or improved. On the other hand, because of the new layer of interactivity that has

distinct and novel expression. IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization.

⁴³⁵ As a general rule, the expression_t only consists of these elements which are “integral to the intellectual or artistic realization of the work”. The problem is that, sometimes, it can be difficult to determine whether a different manifestation_t involves any modification also to the expression_t of a work_t. In addition, slight modifications in the expression_t might in fact remain unnoticed, or they may be mistakenly regarded as changes to the manifestation_t. Moreover, the new manifestation_t may reproduce verbatim the original expression_t of a work_t, while also adding some additional content to it. While this additional content could theoretically qualify as the expression_t of a new work_t, it could however also be regarded as a new expression_t of the original work_t. Besides, because of the increased dynamicity that is enabled with digital media, the expression_t may no longer be a static entity. Accordingly, while the content that inheres into the paper-back edition of a book can easily be compared to the content that inheres into the soft-cover edition of the same book, the expression_t that inheres into the HTML version thereof may however be more difficult to identify insofar as the content can be dynamically generated and is therefore likely to depend upon particular preferences and users’ behaviors. For more details on the difficult to unequivocally define the expression_t of a work, see the various answers to the invitation to participate at the world-wide review of revisions to FRBR section 3.2.2 (definition of the entity expression), available at <http://archive.ifla.org/VII/s13/wgfrbr/expression-invitation.htm>

⁴³⁶ Under copyright law, substantial similarity refers to the degree of similarity that is required in order to have a valid cause of action against copyright infringement. Substantial similarity should be assessed both quantitatively and qualitatively, so that a work may be held to be infringing upon the copyright of another even where it does not feature identical textual, visual or audible elements. Yet, since there is no objective definition of what constitutes substantial similarity for any given category of works, the question is to be addressed on a case-by-case basis. For more details on the substantiality requirement and the potential risk of court errors in copyright infringement cases, see e.g. KHONG, D. W. K. (2004) Copyright Doctrines and Court Error. *Law and Economics*. University of Strathclyde, UK.

been implemented in the digital framework, the evolution of many digital works_t has become fundamentally unpredictable (see e.g. Wikipedia, Flickr, YouTube, and any other website whose content is essentially produced by a community of end-users). As such, a digital work_t can no longer be regarded as a static work_t, but rather as a dynamic work_t whose format and content are both likely to evolve over time.

While this may ultimately result into the articulation of a completely different expression_t, it is nevertheless difficult to determine the exact point in which the resulting expression_t has become sufficiently different from the original. Because digital works are commonly undergoing changes over time, the challenge is to determine when a derivative work can no longer be regarded as an evolution of the former expression_t, but rather as an independent entity which has acquired a copyright in its own right. Establishing equivalence at the level of the expression_t may therefore require a higher degree of discretionary judgment in the digital environment than in the physical world.

Moreover, given that every conversion is likely to result into the loss of a particular type of data, it is necessary to determine whether the loss pertains to the expression_t or the manifestation_t of the work_t. As a general rule, in order to determine whether a change in the expression_t should be regarded as producing a new expression_t or a new manifestation_t, one should look at whether the change is the mere consequence of conversion (i.e. resulting from the transfer from one medium to another) or whether it has been intentionally generated (i.e. resulting from a voluntary act to modify the content of the work).⁴³⁷ While it is generally straightforward for a human being to determine whether the data loss pertains to the expression_t or to the manifestation_t, it is likely to be much more difficult for an automated system to come to the right conclusion. Indeed, in so far as it ultimately depends upon the type of work_t that is being converted and the medium from which and into which it is being converted, the assessment cannot be resolved autonomously without external knowledge pertaining to the context in which conversion has been performed.

This notwithstanding, and in spite of some criticism related to the concept of the expression_t as it has been defined by the FRBR,⁴³⁸ identifying the expression_t of a work_t as a separate entity may ultimately result in two significant advantages. On the one hand, it permits the establishment of a relationship between the different expressions_t of the work_t (horizontal relationship). On the other hand, it brings together the

⁴³⁷ Converting a digital file from one format to another may often lead to a certain amount of data loss. However, the data which has been lost may relate to either to the expression_t or to the manifestation_t thereof according to whether the loss is a direct consequence of a change in the medium (e.g. lower quality, cropped content, different aspect ratio, color vs. black & white, etc) or whether it has been intentionally imparted to the content by a sentient being (e.g. a person may intentionally decide to produce a black & white version of a photograph, or to eliminate certain sections of a literary work, etc). The former will lead to a new manifestation_t that represent the same expression_t of the work_t, albeit in a substandard way, whereas the latter will necessarily produce a new expression_t of the work. For more details, see YEE, M. M. (2007) Understanding FRBR - FRBR and Moving Image Materials: Content (Work and Expression) versus Carrier (Manifestation). Los Angeles, University of California.

⁴³⁸ In assessing the application of the FRBR to the work "The Expedition of Humphry Clinker", Edward O'Neill declared the notion of expression_t to be unnecessary. He claims that the distinction between expression_t and manifestation_t may sometimes result in an overly fine granularity, and that the material benefits derived by the additional level of abstraction would not be sufficient to compensate for the additional costs of analysis. O'NEILL, E. (2002) FRBR: Functional requirements for bibliographic records: Application of the entity-relationship model to Humphry Clinker. *Library Resources & Technical Services*, 46.

various manifestations_t of any given expression_t, thereby indirectly ascertaining their connection with the original work_t (vertical relationship).

C. THE MANIFESTATION

If the expression_t is taken to refer only to the symbolic content of a work_t, before it can be embodied into a particular medium of expression, it must be encoded into a format compatible with the distinctive characteristics of the physical medium into which it is intended to inhere. The embodiment of the expression_t into a particular medium of expression can therefore only be achieved through the help of an entity which precisely describes the way in which the content of that work_t is to be communicated to the public.

The manifestation_t is a generic entity which refers to the physical representation of a particular expression_t according to the specific format in which the work_t is being conveyed to the public. Devoid of any physical subsistence, it consists of the recording of an expression_t into a material item. As such, the manifestation_t comprises every embodiment of one particular expression_t into one particular medium of expression, but only provided that they all feature analogous characteristics of form. Yet, although the manifestation_t necessarily refers to the physical embodiment of a work_t, it does not refer to any physical object *per se*. It is a general concept that comprises all physical representations of the work_t insofar as they share identical characteristics in terms of content and physical appearance.⁴³⁹ In other words, according to the definition provided by the FRBR, the manifestation_t serves to describe the shared characteristics of copies in terms of their formal and physical characteristics. As a result, in the physical environment, the identity of a manifestation_t ultimately depends both upon the format assumed by a particular expression_t and upon the physical characteristics of the medium into which it has been incorporated.

The manifestation_t is therefore more directly related to a particular medium of expression than is the work_t or the expression_t. As such, however, the manifestation_t does not constitute the lowest level of abstraction: it is directly connected to the physical representation of the work_t, but it does not itself belong to the physical realm. To the extent that it subsists at a higher level of abstraction, any given manifestation_t may therefore be recorded into an indefinite number of items_t which are related to each other by reason of their common origin. As such, the function of the manifestation_t is ultimately to identify all items_t that can be regarded as equivalent to each other to the extent that they incorporate the same expression_t of the work_t and communicate it in an identical manner. Any change in either of these two factors would necessarily result into a different manifestation of the work.

In particular, there are some cases in which the manifestation_t of a work_t can only be recorded once. This may occur whenever the manifestation_t cannot be distinguished from the physical object it has been recorded

⁴³⁹ The manifestation_t of a work may refer to large variety of different materials, such as manuscripts, books, magazines, photographs, paintings, drawings, sound recordings, video recordings, CD-ROMs, DVD-ROMs, or any other physical embodiment. More precisely, according to the FRBR's definition, the manifestation "as an entity [...] represents all the physical objects that bear the same characteristics, in respect to both intellectual content and physical form". IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

into, such as, for instance, in the case of manuscripts, sketches, paintings, or any other unique works of authorship whose manifestation may not be reproduced into any other item_t, since any attempt to do so would necessarily produce a new manifestation_t.⁴⁴⁰

As a general rule, a new manifestation_t is created whenever there is a change (1) in the format by which an expression_t is being conveyed to the public, or (2) in the physical medium into which it has been incorporated. Different representations of the same expression_t would therefore automatically result into separate manifestations_t. Likewise, the incorporation of the very same expression_t into different media (e.g. physical versus digital medium) or in a different format would inevitably generate different manifestations_t. For example, in the case of a literary work, while, on the one hand, different typographical arrangements will always and necessarily qualify as different manifestations_t of the same expression_t, on the other hand, the hard-cover edition of a book will also be regarded as a different manifestation_t from the paper-back edition of the same book - regardless of whether or not they share an identical typographical arrangement. While, in the former case, the manifestation_t is being directly modified, in latter case, the new manifestation_t results from the mere transposition of the original manifestation_t into a different medium.

Under the traditional FRBR approach, therefore, the criteria employed to determine equivalence between the different instances of a work are basically relates to (1) the expression_t, (2) the format it assumes, and (3) the physical medium of expression into which it is being conveyed to the public. Assuming that these three elements are identical, the different instances of the work can generally be regarded as being equivalent in terms of their manifestation_t.

As such, even though it does not qualify as a physical entity, the manifestation_t can be identified according to the physical features of the medium to which it refers.⁴⁴¹ In spite of its abstract character, the identity of the manifestation_t is therefore relatively straightforward to establish because it basically represents the stage at which a work_t actually becomes tangible.

The situation becomes more complex in the case of digital works. As a general rule, in the digital environment, the manifestation_t can be defined as the representation of a particular expression_t which has been encoded into a digital medium according to a specific format. In practice, however, one important difference subsists between the physical and the digital manifestation_t of a work. In the physical environment, the

⁴⁴⁰ The manifestation_t which has been produced and intended as a unique object is a particular entity which amounts to a manifestation-singleton. It differentiates itself from the standard notion of manifestation_t because it may subsist only in one item_t. Note that a manifestation_t which allows for the production of more than one item_t may not constitute a manifestation-singleton, regardless of the fact that it has been decided to produce only one item_t or that all items_t that have been produced have been subsequently destroyed. See IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization.

⁴⁴¹ The manifestation_t can be regarded as the physical embodiment of one particular expression_t. The manifestation_t basically describes all physical characteristics that pertain to the medium on which a work has been recorded. It does not however refer to the physical medium as such, but rather to all the physical objects that share identical characteristics of content and form. Intrinsically an abstract entity, the manifestation_t ultimately describes a particular set of physical entities with similar attributes. See CARLYLE, A. (2007) Understanding FRBR as a Conceptual Model: FRBR and the Bibliographic Universe. *Bulletin of the American Society for Information Science and Technology*, September 2007.

manifestation_t is intrinsically related to the actual medium of expression (the physical item_t) in which it has been embodied— e.g. the hard-cover edition of a literary work constitutes a different manifestation_t than the paper-back edition of the same work. In the digital realm, instead, given that it merely consists of a series of bits, the manifestation_t of a digital work does not depend upon the physical characteristics of the digital device into which the work has been stored.

The task of establishing the identity of a manifestation_t is therefore likely to be more challenging in the digital environment. Provided that it displays identical characteristics in terms of both quality and format, the very same manifestation_t may subsist simultaneously in the physical memory of a computer, in the file system of an external hard-drive, in the sectors of a CD-ROM, or in any other digital device. To the extent that a digital work can be transferred from one medium to the other without incurring any change in its format, the digital environment can be regarded as a universal medium whose characteristics subsist independently of the physical attributes of the actual carrier of information.⁴⁴²

As a result, one less factor has to be accounted for in order to identify the manifestation_t in the digital environment. As opposed to the standard FRBR approach, according to which the manifestation_t is intended to distinguish between the different representations of a work according to (1) the expression_t, (2) the format, and (3) the physical medium in which it has been incorporated, in the digital environment, the manifestation_t is no longer associated with any physical medium of expression, but rather with the digital medium as a generic medium. In the digital world, equivalence between different manifestations_t can ultimately be assessed according to (1) the expression_t they incorporate and (2) the format assumed by that particular expression_t.⁴⁴³

⁴⁴² As a result of the process of media convergence, differences between distinct categories of media are becoming irrelevant in the digital environment. On the one hand, a particular digital work can be stored into any digital medium. In fact, as the work has become intangible, it is no longer fixed to one particular medium and it can thus freely travel from one medium to the other. On the other hand, any digital medium can be used to store any particular type of digital work. Indeed, once a work has been digitized, there is no longer any difference between a literary work, a musical work or an audiovisual work, since they all merely consist of a series of 0's and 1's and can thus all be stored together into the same medium. In the digital world, therefore, different digital media have therefore become equivalent for the purposes of storage and transmission. For more details, see e.g. MUELLER, M. (1999) Digital Convergence and its Consequences. *The Public*, 6, 11-28.

⁴⁴³ In the physical environment, the manifestation_t of a work is defined according to (1) the characteristics of form (e.g. the typographical arrangement of a literary work, the shape and the material of a sculpture, the size and the quality of a picture, etc) and (2) the characteristic of the physical medium it has been associated with (e.g. the physical characteristics of the book in which a literary work has been published, the type of paper on which a picture has been printed, etc). In the digital environment, instead, the definition of the particular manifestation of a work is not concerned with the characteristic of the physical medium into which is being conveyed to the public, but merely with the particular form that any given expression_t may assume into a digital medium. As a result, the MPEG and the DIVX version of an audiovisual work (e.g. an action movie) may or may not qualify as the same manifestation_t, according to whether or not they exhibit identical characteristics of form (e.g. same video and audio quality, same volume), as well as an identical structure and configuration (e.g. same frame, same choice of subtitles, etc), but irrespectively of the format in which they have been encoded.

D. THE ITEM

According to the FRBR framework, the *item_t* is a concrete physical object that exhibits a consistent set of attributes over time.⁴⁴⁴ It represents a tangible carrier of information which results from the fixation of a particular *manifestation_t* into a physical medium of expression (e.g. the particular book purchased by an individual, the specific digital file downloaded from an online store by a particular user or accessed through the Internet at a particular address, but also the specific section of human memory into which information has been stored).

As such, the *item_t* is perhaps the most relevant aspect of a work in the context of bibliographic records, because it refers to the actual entity that is responsible for conveying information to the public. Indeed, as opposed to the three other aspects of the work, the *item_t* is a token (as opposed to a type) which can only exist as a single instance.

Being that it is the only element of the work that actually exists in the real world, the *item_t* represents the ultimate platform on which any work of authorship can essentially be consumed. For instance, in the physical environment, the only way for an individual to actually experience a work (e.g. Hamlet by Shakespeare) is through the physical representation of that work into a physical medium of expression (e.g. the copy of a book embodying the work). Similarly, in the digital environment, whenever an individual is consuming a work, it is through the physical representation of that work into a particular medium which is capable of converting the information stored into the memory of a digital device into something that can actually be experienced in the physical world (e.g. a particular section of memory of the digital device into which the work has been stored).⁴⁴⁵

As a general rule, therefore, the fundamental function performed by the *item_t* is to provide a conceptual framework for every instance of a *work_t* (1) to be identified as a separate entity with its own and unique characteristics of form, and (2) to be consistently recognized as such regardless of its actual location.⁴⁴⁶

⁴⁴⁴ According to the FRBR, an *item_t* is a *single* exemplar of a *manifestation_t* which consists of a *concrete* entity. In addition, the FRBR suggests a number of attributes that can be assigned to an *item_t* (such as the identifier, the provenance, the various marks or inscriptions, the condition, and the access or usage restrictions) to the extent that they can be logically related to that particular *item_t*. IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

⁴⁴⁵ The concept of a work usually refers to an abstract entity. As such, therefore, the work cannot be experienced unless it has been incorporated into a physical entity. The notion of an *item_t* refers to the physical representation of that entity through which the work can be experienced. It is the particular *manifestation_t* that a *work_t* may assume in the physical world. Hence, both in the physical and in the digital environment, users may only experience a *work_t* after it has been stored into a medium (be it physical or digital) which can be accessed from a physical device. See e.g. GUNDER, A. (2001) *Forming the Text, Performing the Work: Aspects of Media, Navigation, and Linking*. University College of Borås, Sweden.

⁴⁴⁶ According to the FRBR, “defining item as an entity enables us to separately identify individual copies of a manifestation, and to describe those characteristics that are unique to that particular copy and that pertain to transactions such as circulation, etc. involving that copy.” IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

Until recently, individuating the scope of an item_t has always been a relatively straightforward process. As a tangible entity, in fact, the item_t enjoys a concrete representation in the physical world which allows for it to be uniquely identified according to its physical characteristics.

All items_t derived from the same manifestation_t are supposedly identical with each other and reproducing one of them would normally generate a new item_t which would itself amount to an exact reproduction of the same manifestation_t. Sometimes, however, items_t may acquire certain distinctive characteristics either as a result of a defect during the process of production (e.g. misprinted characters, incorrect recording) or as a result of voluntary and/or involuntary changes incurred after the items_t have been produced (e.g. annotations, missing pages in a book, alteration of an image, gradual deterioration of memory).⁴⁴⁷ Yet, in view of its physical character, an item_t will maintain its identity regardless of the changes it may incur after it has been produced.

As straightforward as it may be in the physical world, the notion of the item_t is much controversial in the digital environment. If it is to remain consistent with the definition of the FRBR framework, the identity of an item_t must exclusively depend upon the physical representation of the work. Hence, in spite of the distinctive characteristics of digital data, the item_t of a digital work can be defined only in terms of the physical characteristics of the tangible medium of expression in which the work has been stored.⁴⁴⁸

Every instance of a digital work should therefore be regarded as a distinct and separate entity which distinguishes itself from the others according to the physical state it assumes in the memory of a computer or other digital device. While such a definition would be consistent with the function traditionally performed by the item_t in terms of distinguishing every single instance of a work as a separate entity, defining the item_t of a digital work according to the way it is represented in the memory of a computer is likely to be incompatible with the conception of an item_t as it is commonly understood.

To begin with computer memories are rewritable, and thus not permanently associated to the manifestation_t of a particular work. As opposed to the physical world, therefore, the item_t of a digital work only constitutes a temporary medium of expression which cannot be perpetually associated with the content of the work it incorporates. As a result, the identity of an item_t in the digital environment is deemed to be inherently ephemeral.

⁴⁴⁷ Any item_t incorporating a particular manifestation_t is normally the same as the manifestation_t itself, in terms of both intellectual content and physical form. Variations from the original manifestation are exclusively the results of actions that are independent from the original intent of the producer. Ibid.

⁴⁴⁸ According to the FRBR framework, an item_t is an entity which is a concrete physical object which is used to record or convey information. In the digital world, the entity that is the most similar to the FRBR definition of an item_t are the concrete physical states of the computing system on which a digital work has been stored. Yet, such a definition is likely to be problematic, since, in view of the ephemeral nature of the physical states of a computer system, an item_t in the digital environment will be unable to uphold all the attributes that are commonly assigned to an item_t in the physical world. For more details, see FLOYD, I. R. & RENEAR, A. H. (2007) What Exactly is an Item in the Digital World? *The American Society for Information Science and Technology*. Milwaukee, Wisconsin.

In addition, in the digital environment, it has become increasingly difficult to identify the particular instance of a work according to its physical characteristics. While the reproduction of a work necessarily produces a new representation of the work which would inevitably qualify as a new item_t, problems may arise whenever a digital item_t is moved from one computer to another. In order to be transferred, the item_t at the original location has to be destroyed for a new one to be produced at the newly specified location. The problem is that, given the form it assumes in the memory of a computer, even the mere transfer of an item_t from one device to the other would necessarily produce a new item_t whose physical representation inevitably differs from the former.

Since the material representation of any given instance of the work is inevitably going to change every time it is moved from one location to the other,⁴⁴⁹ relying on the physical characteristics of the item_t in order to provide a proper definition is likely to be unpractical and significantly reducing the value of identifying the item_t as an individual entity in the digital environment. Indeed, from the perspective of end-users, insofar as they both incorporate the same digital representation of the work, different items_t will generally be regarded as being the same regardless of their differences in terms of physical attributes and location.⁴⁵⁰

⁴⁴⁹ A digital item_t is a piece of content that is expressed in a digital format and subsists as a tangible entity on the physical memory of computers or other electronic devices. The transfer of a digital item_t, however, necessarily involves reproduction. Transfer can only be achieved by generating a copy in a new location and subsequently destroying the original. These two items are therefore likely to assume a completely different physical representation while nonetheless maintaining their distinctive properties as digital items. See PASKIN, N. (2003) On Making and Identifying a Copy. *D-Lib Magazine*, 9.

⁴⁵⁰ In order to be moved, the item_t has to be reproduced into a new item_t representing the same content into an identical digital format. Although they differ with regard to the physical representation of data on the hard-drive, the two items_t may, under certain circumstances, be recognized as one. In fact, although two digital entities are never the same in any absolute sense, they can nevertheless be considered to be identical in the context of some defined purpose. In the digital environment, an item_t can be properly identified only when taking into account the context into which the item has to be identified. For more details, see: Ibid.

EMPIRICAL APPLICATION

While the four constitutive elements identified by the FRBR have been originally conceived to describe literary works in the context of bibliographic records, the way in which they have been defined is sufficiently generic for them to be applied to all types of works, regardless of their nature or form. Every work of authorship – be it a literary, dramatic, musical or artistic work - can fundamentally be subdivided into four different parts, each describing a particular aspect of the work from a different layer of abstraction.

| FRBR | SHAKESPEARE'S HAMLET | DA VINCI'S MONA LISA | BEETHOVEN'S FUR ELISE |
|----------------------|--|---|--|
| WORK | The tragedy of Hamlet, Prince of Denmark, as he tries to revenges his father's death by killing his uncle Claudius who had taken the throne. | The portrait of a woman with an odd and enigmatic facial expression depicted in front of an imaginary landscape. | The romantic melody composed by Ludwig van Beethoven under the form of a bagatelle in rondo form. |
| EXPRESSION | The linguistic content of the script, represented by the particular arrangement of words that communicates the story, or one specific performance thereof. | The specific set of brush strokes and the particular selection of colors that constitute the oil painting. | The specific selection and arrangement of notes and instruments that comprises the composition. |
| MANIFESTATION | The layout and typographical arrangement of a published edition, also accounting for the medium on which it has been published (e.g. paperback versus hard-cover book) | The specific set of brush strokes and oil paints as applied to a particular category of canvas (singleton). | The recording of the melody into a specific medium, or the actual performance thereof by an orchestra. |
| ITEM | My particular copy of the book as a tangible entity that distinguishes itself from other copies of the book by virtue of its physical attributes. | That particular canvas over which Leonardo da Vinci has originally painted the Mona Lisa in the 16 th century. | The physical medium in which the melody has been recorded (including the human brain). |

In particular, in order to provide a more comprehensive analysis of the manner in which the constitutive elements of a work actually relate to each other in a practical situation, Hamlet by William Shakespeare will be used as a potential illustration.

To begin with, the *work_t* can be identified through the fundamental ideas underlying the literary creation and the way in which these ideas have been structured – e.g. the general idea of the work, the storyline, the leading characters along with the distinctive properties thereof. As such, the *work_t* is sufficiently generic not to be restrained to one particular type of *expression_t*. Although originally born as a literary creation, Hamlet may assume a variety of *expressions_t* of different nature. For instance, if the dialogues of Hamlet are turned into a play, that new *expression_t* will constitute a dramatic work, whereas, if the play is subsequently adapted into a movie, the resulting *expression_t* will instead constitute a cinematographic work. While their nature may eventually differ, any potential variation or adaptation will merely constitute a new *expression_t* of the same *work_t* – as long as that the original concept and the underlying impression of the work remain integrally the same.

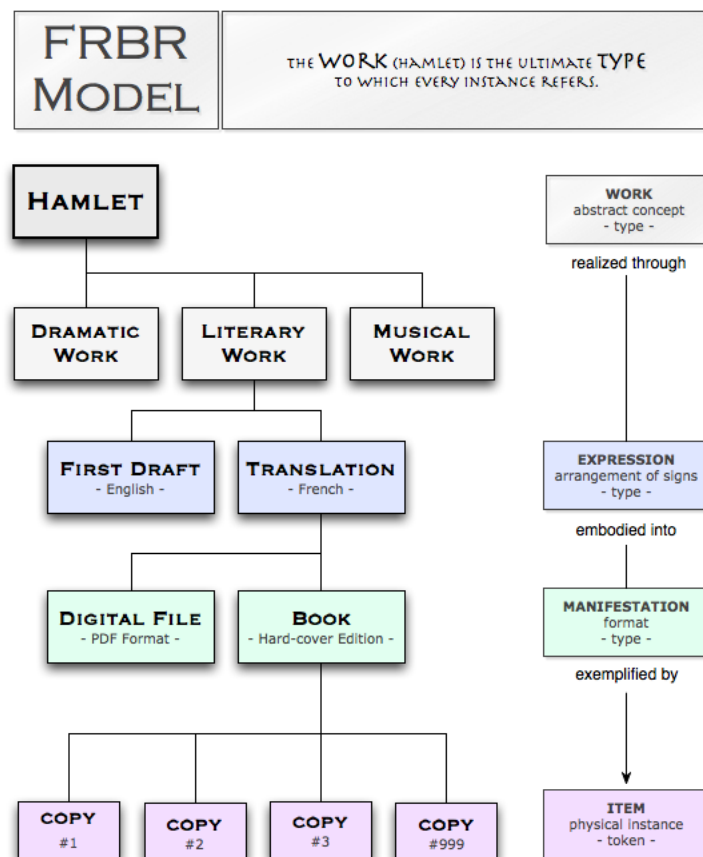
The original manuscript written by William Shakespeare articulates a particular arrangement of words (the literary content) which constitutes an original *expression_t*. Provided that they are able to communicate the same literary content, the *expression_t* can be extracted and subsequently embodied into a multitude of different media. Whether it has been embodied in a manuscript or a mass-produced book, the *expression_t* will remain the same. Likewise, to the extent that the literary content is kept intact, the original *expression_t* could be incorporated into the lyrics of a musical work and still be regarded as being the same. Conversely, any subsequent revision, update or translation would ultimately produce a new *expression_t* in spite of the fact that they would both articulate the same original concept. Similarly, the adaptation of a particular *expression_t* from one format to the other (e.g. from a literary work to a dramatic work or to a cinematographic work) would necessarily produce a new *expression_t* whose content would inevitably differ from the former.

The *manifestation_t* is concerned with the format in which the work is being conveyed to the public. In the case of Hamlet, therefore, the original manuscript of the work as drafted by William Shakespeare constitutes a distinct and unique *manifestation_t* of a particular *expression_t* of Hamlet (*manifestation singleton*). The very same *expression_t*, recorded into a subsequent edition of the book, constitutes a separate *manifestation_t* of to which every copy of the book would ultimately refer,⁴⁵¹ while different typographical arrangements or media (e.g. hard-cover versus paper-back) would necessarily give rise to a new *manifestation_t*. Accordingly, every given edition of a work, or any recording thereof into a different medium would inevitably produce a distinct *manifestation_t*.

The *item_t* represents the physical instance by which the *manifestation_t* has been exemplified into the physical world. Every tangible copy of a book incorporating an identical or different *manifestation_t* would necessarily constitute a unique and separate *item_t*. Yet, the alteration of the format or form of an *item_t*

⁴⁵¹ Specifically, according to the FRBRoo model, the original manuscript would be regarded as a Singleton Manifestation whereas the characteristics that define the published edition of a book would constitute a Manifestation Product Type. IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization.

occurring after the process of production (e.g. loss of pages, rebinding) would not give rise to any new item but would merely affect the inherent characteristics of the particular item concerned.



As for the digital environment, in order to better illustrate the characteristic features of the aforementioned entities and the role that they may assume in the identification and the description of the constitutive elements of a digital work, a supplementary example may be of valuable assistance. In particular, an interesting example is that of an Internet website, whose identification is particularly problematic in view of the dynamic nature of its content, the malleability of its form and the volatility of its physical location.⁴⁵²

As previously mentioned, the work_t is an entity that refers to the underlying idea(s) of a particular work of authorship. In the case of an Internet website, therefore, the work_t basically refers to the general concept of the site, which basically includes the role, the function and the overall structure of the website. The purpose of

⁴⁵² Digital documents are variable and dynamic in character. In particular, network accessible documents such as websites, are evolving continuously over time and are likely to be moved from one location to the other whenever the need arises. Moreover, a single document may be delivered differently to different users, according to what the users' preferences. For instance, certain websites make their web pages available under different layouts that can be selected by users. Others might disclose a different amount or type of information according to the identity of the users visiting the webpage. Finally, the most interactive websites may allow users to individually select the information they desire to be displayed into a particular webpage. Websites are therefore inherently dynamic, as their content is likely to evolve over time, and potentially interactive, as their content may actually vary according to user input See NUIYS, C. V. & ALBERTSEN, K. (2003) Identification of Network Accessible Documents: Problem Areas and Suggested Solutions. *Conference on Research and Advanced Technologies for Digital Libraries*. Trondheim, Norway.

identifying the work_t as a separate entity is essentially that of establishing the identity of a particular work of authorship regardless of the way in which it has been expressed and subsequently represented in the physical world. Hence, different implementations of a website could potentially be regarded as different instantiations of the same work_t in spite of their differences in content and layout, provided that they all articulate the same general concept as an abstract and yet sufficiently detailed idea. For instance, the concept of Wikipedia⁴⁵³ is to create a free encyclopedia that anyone can edit. Although the content of the website is continuously changing as a result of new users' contributions, as long as the website is able to maintain its own identity over time, it will nonetheless qualify as the same work. Moreover, different versions of Wikipedia have been implemented⁴⁵⁴ to allow for users from different countries to be able to contribute, access and edit entries in their own languages. The content of each website is unique to that website because it is entirely user-generated and the layout may sometimes vary from one website to the other. Yet, provided that the general concept they embody is the same, they can all be regarded as a particular instantiation of the same work_t.

The expression_t refers instead to the syntactic content of a particular work of authorship. With regard to an Internet website, for instance, the expression_t basically amounts to the actual content of the web pages (e.g. the particular selection of words, images, sounds, videos) as it was at a specific point in time. As a result of their dynamic character and interactive nature, however, many websites are likely to feature a very large number of expressions_t. Indeed, given that the identity of an expression_t is ultimately determined by that particular arrangement of signs and symbols that a particular work of authorship is made of, a new distinct expression_t will necessarily be generated every time the content of an Internet website is updated.⁴⁵⁵ For instance, in the case of Wikipedia, every time a user submits a new entry, a new expression of the online encyclopedia is created.⁴⁵⁶ Although they all constitute an expression_t of the same website, every

⁴⁵³ Wikipedia is an online encyclopedia whose articles are collaboratively written by users. Anyone who can access the website can also produce a new article or amend a pre-existing one anonymously. The content of the website is therefore likely to be updated extremely frequently, mainly as a result of the considerable number of users that make use of the encyclopedia every day. See <http://wikipedia.org>

⁴⁵⁴ As of 2009, there are currently 262 different language editions of the Wikipedia website. Although the English edition is by far the most comprehensive one, a number of other editions such as the French, the German or the Japanese one, already feature a considerable number of articles. See e.g. <http://fr.wikipedia.org> (with more than 788 000 articles), <http://de.wikipedia.org> (with more than 890 000 articles), <http://ja.wikipedia.org> (with more than 577 000 articles), etc

⁴⁵⁵ While the World Wide Web was originally made of static web pages, in recent years, it has become ever more characterized by dynamic and interactive websites based on user interaction and participation. In particular, with the advent of Web 2.0 technologies (such as forums, blogs, wikis, etc), the web has developed into a platform that allows users to communicate and to share information online. Nowadays, in fact, a large number of websites essentially rely on user generated content in order to provide information to their users. See e.g. Wikipedia at <http://www.wikipedia.org>, an online encyclopedia completely written by users; Blogger at <http://www.blogger.com>, where users can create their own blog and make it available to the Internet community; Flickr at <http://www.flickr.com>, an online archive for digital photos where all photos are uploaded, commented and tagged by users; MySpace at <http://www.myspace.com>, a social network website allowing users to create they own personal page; etc

⁴⁵⁶ The concept of Wikipedia has been implemented by the means of a sophisticated wiki allowing anyone to create, edit, or request the removal of a particular article. As a general rule, while everyone can modify a pre-existing article, only registered users may create a new article, although anyone can become a registered user after completion of the registration form. An exception has however been made for a number of vandalism-prone pages, which can only be edited by established users or by administrators. As

expression_t distinguishes itself from the others on the basis of lexical and syntactical differences and should therefore be regarded as a different expression_t of the same work_t.

The manifestation_t describes the format in which a particular expression_t is being conveyed to the public. As such, it basically refers to one specific articulation of the work_t represented according to particular characteristics of layout or style and encoded into a particular medium of expression. Given that an Internet website necessarily exists in the digital environment, it can be said to subsist in the digital medium as a generic entity. Hence, the manifestation_t of an Internet website is ultimately determined by the layout assumed by a particular expression_t of the website and by the digital format in which it has been encoded. Accordingly, although one is the direct output of the other, the PHP source code of the website would not qualify as the same manifestation_t as the resulting HTML code, because the latter cannot be reverted back to the former.⁴⁵⁷ As a general rule, the manifestation_t of an Internet website is basically defined by the specific choice of markup (i.e. the actual HTML code of the website) and the specific attributes of styling (e.g. the relevant CSS style-sheets or any additional formatting rules). The content of a particular website could in fact be potentially represented into an indefinite number of ways, with an indefinite number of layouts, graphics or designs. For instance, Blogger⁴⁵⁸ is a blog publishing system which offers a large number of web templates for users to select the format, the layout and the overall graphical appearance of their blogs. Although they all qualify as the same expression_t, every template applied to a blog constitutes a different manifestation_t of the blog to the extent that it modifies its layout or form.

As a particular type of manifestation_t, the digital file corresponds to the actual representation of a work into a digital medium of expression: it represents that particular sequence of bits into which a work has been encoded. In the case of an Internet website, the digital file ultimately refers to a combination of bits which can be interpreted by a computer in order for a web server to produce a particular representation of the website which can be understood by a web client. In particular, the digital manifestation_t must account for the specific technological measures of protection which have been incorporated into the digital work, together with the corresponding metadata. Every instance of the website that features a different set of metadata (e.g. different meta-keys) will necessarily amount to a different manifestation_t, even though the representation of the website on the screen of a computer would nevertheless be identical.

no peer-review is required, all articles and changes are made available immediately after they have been submitted. See <http://wikipedia.org>

⁴⁵⁷ PHP is a scripting language that was especially designed for web development. PHP code can be embedded into an HTML document in order to produce dynamic web pages. More precisely, every time the PHP code is interpreted by the web server, the server generates a new web page which is exclusively made of HTML. Accordingly, while it is pretty straightforward to convert a PHP file into HTML, the reverse is however impossible to achieve.

⁴⁵⁸ Blogger is a blog publishing system owned by Google which allows anyone to register in order to create and maintain a blog. In particular, blogger offers web standard-compliant templates for users to select the preferred layout for their blogs. Templates can also be directly modified by users in order to create customized layouts. See <http://www.blogger.com>

Finally, the item_t is an entity which essentially refers to the physical embodiment of a work. More precisely, in the context of digital works, the item consists of the actual and concrete representation of a digital file into the memory of a computer or other digital device. Accordingly, with reference to an Internet website, one item_t necessarily subsists in the memory of the computer in which the website has been stored, and every time the website is being accessed, a new copy of that item_t is created in the memory of the user's computer.⁴⁵⁹ Since they all incorporate the same digital file, all these items_t are identical in their content, however, given that they differ with regard to their physical characteristics, they cannot be regarded as the same physical item_t.

| | WIKIPEDIA WEBSITE |
|----------------------|---|
| WORK | The general concept of the website, as defined by its role, function and structure: Wikipedia's concept is to produce a free encyclopedia that anyone can edit. |
| EXPRESSION | The content of the website, which consists of words, images, sounds, videos, etc. A new expression is produced whenever the content of the website gets updated. Wikipedia assumes a new expression every time a user submits a new entry. |
| MANIFESTATION | The formal characteristics that constitute the layout and the style of the website, but also the format into which the website has been encoded into a digital device. Wikipedia's content can be displayed in various markups (HTML) or styles (CSS) |
| ITEM | The concrete representation of a digital file into the memory of any digital device An item of the website necessarily subsists in Wikipedia's web server's computer A new item is created in end-users' computers every time the website is accessed |

⁴⁵⁹ Whenever a user visits a website, the user's browser must first submit a HTTP request to the relevant web server and must then fetch the requested web pages and their corresponding content from the Internet. Sometimes, the browser may even store them into the computer cache in order to speed up any subsequent access to the website. Either way, every time a user accesses a website, a copy thereof is necessarily created in the memory of the computer of that user.

COPYRIGHT WORKS

UNDER THE FRBR

Having identified the entities that can be used to describe the different aspects of a work under the FRBR framework, it is now necessary to establish the specific amount of protection they have been granted with under the copyright regime.

In view of the need to create a balance between incentives to create and public access to information, the copyright in a work does not uniformly protect every aspect of work. The *work_t*, the *expression_t*, the *manifestation_t* and the *item_t* are all - to some extent - protected by the law, although they are each regulated according to a different set of rules and principles. Indeed, to the extent that they subsist at different layers of abstraction, the legal protection granted to these four entities is ultimately justified on different grounds.

In particular, given that copyright law belongs to the realm of intellectual property law, it does not provide any kind of protection to the physical medium into which a work has been incorporated (the *item_t*). Conversely, while the *work_t* definitely qualifies as an intellectual asset, it is however too generic to actually be eligible for copyright protection. After a preliminary analysis, it may seem that the object of the copyright resides somewhere in between the physical *item_t* and the *work_t* as a general concept. As a matter of fact, however, the scope of the copyright is broad enough to affect – either directly or indirectly – every one of the four entities identified within the FRBR framework.

In order to understand the level of protection that a work has been granted with under copyright law, it is necessary to identify the extent to which the copyright regime is actually concerned with the constitutive elements of the work. The problem is that the provisions of the copyright regime which actually contribute to defining the scope of copyright protection do not explicitly refer to any of the constitutive elements of the work, but only to the work as a whole or to the expression thereof. A systematic examination of the copyright regime is therefore required in order to determine (1) the manner in which the different provisions of copyright law actually relate to the various entities identified within the FRBR framework, and (2) the extent to which copyright protection ultimately applies to the different components of a work.

Identifying the scope of copyright protection is especially relevant within the context of the licensing of rights. The exclusive rights granted under the law can be licensed by their respective copyright owners for third parties to legitimately access or consume a work.

These rights can, however, be subdivided according to an indefinite number of criteria, e.g. they may only be licensed for a limited period of time; they may only refer to a particular form of exploitation (e.g. commercial vs. non-commercial); or they may only relate to one particular aspect of the work (e.g. the *item_t*, the

manifestation_t, the expression_t, or the work_t as a general concept). An accurate identification of the object of the rights that are being licensed is therefore crucial to ensure a proper exploitation of the work. While the majority of copyright licenses for the commercial exploitation of a work are usually very precise with regard to the scope of the rights that are being licensed, in the framework of end-user licensing agreements, it is often the case that the copyright license does not appropriately describe the object of the rights vesting in a particular copy of the work.

Before it can be employed in the context of a copyright license, it is therefore necessary to determine two things: (1) the extent to which the copyright regime protects the various entities identified within the FRBR framework, and (2) whether these entities can actually be used in order to identify the scope of the rights and obligations granted under a copyright license.

Most importantly, in order for end-users to enjoy the rights they have acquired over a particular copy of the work, they must be able to precisely establish the scope of that copy so as to determine the extent to which they are entitled to use or to consume the work. Accordingly, after the subject matter of the copyright regime has been defined and the actual scope of copyright protection has been established, the object of the rights vesting into the particular copy of a work and the corresponding right holders should be precisely identified.

For this to be achieved, a fundamental requirement is to provide a proper definition of what constitutes the ‘copy’ of a work, in order to determine the extent to which the end-user licensing agreement actually applies to the different instances of a work. In particular, while it has generally been associated with the physical representation of the work in the real world, identifying the ‘copy’ of a work in the digital environment is likely to be a much harder endeavor.

SECTION 1

THE SCOPE OF PROTECTION

As a general rule, copyright law protects any original works of authorship fixed in a particular medium of expression. The vast majority of intellectual creations are therefore subject to copyright protection, regardless of their artistic value and irrespective of their function or purpose. The distinction between what does or does not qualify for copyright protection is, however, difficult to establish, especially considering that the dividing line may differ from one jurisdiction to another. Indeed, although copyright protection may apply at different levels and to many different kinds of works,⁴⁶⁰ not every work pertaining to a protectable category will necessarily be eligible for protection, and not every constitutive element of a protected work (i.e. the work_t, the expression_t, the manifestation_t, and any item_t embodying the work) will necessarily be entitled to copyright protection.

⁴⁶⁰ The number of works protected under the copyright regime is constantly increasing as copyright law is being reformed to provide protection to new and different kinds of works. For a better overview of the subject matter of copyright law, see *supra* Part I. Chapter 1: Copyright law. Section 1.A: The scope of protection. Subsection 1: Subject matter.

To begin with, copyright law only protects original ‘works of authorship’, which presupposes that the work exhibits at least a minimum amount of individual character arising from the exercise of authorship (as opposed to inventorship).

It is generally said that the copyright regime does not protect an idea but only the expression of an idea.⁴⁶¹ As such, the work_t, as a general concept, is not protected under copyright law. This is not to say, however, that the law does not provide any kind of protection to the concept of a work, but only that, in order to be protected, a work_t must assume a sufficiently developed and detailed structure which can be regarded as something more than a mere idea (e.g. as a general rule, the structure of a work_t can be regarded a very broad expression_t thereof).⁴⁶²

The expression is the fundamental element of a work that is protected under copyright law. Copyright protection has in fact always been regarded as extending only to the expression of a work – as opposed to the underlying facts or ideas expressed by the work.

One problem is that the copyright does not apply to the expression_t as the entity has actually been defined in the FRBR framework (where a new expression_t is produced as a result of every change in the content, however minimal it is). Indeed, in the framework of copyright law, in order to protect right holders against non-literally copying, the scope of copyright protection extends far beyond the scope of one specific expression_t of the work. For instance, the translation of a work from one language to another or the conversion from one medium to another (e.g. the making of a movie based on a literary work) necessarily constitutes copyright infringement insofar as it involves an exact reproduction of the work’s overall structure. Similarly, while paraphrasing does not qualify as copyright infringement *per se*, the act may nevertheless qualify as an infringing activity, if it involves a substantial taking from the overall structure of the work.

⁴⁶¹ See article 9(2) of the TRIPs Agreement: “Copyright protection shall extend to expressions and not to ideas, procedures, methods of operation or mathematical concepts as such.” The idea/expression dichotomy is an important principle of copyright law that distinguishes itself from other forms of Intellectual Property such as patent law in that it is not intended to not protect ideas, theories and facts as such, but only the original expression thereof. A work may therefore refer to the same conceptual idea of another work without the author being subject to any kind of liability, as long as that no substantial taking has occurred with regard to the actual expression of the work. See *Baker v. Selden*, 101 U.S. 99 (1879), the first case to deliberately express the distinction between copyright law, which protects the expression of an idea, and patent law, which protects the fundamental idea itself: the Supreme court held that the copyright in a book does not give an author the right to exclude others from practicing what is described in the book, a judgment which has later been codified in section 102(b) of the US Copyright Act. See also the judgment of Justice Sandra Day O'Connor in *Feist Publications, Inc. v. Rural Telephone Service Co.*, 499 U.S. 340, 349 (1991): “The primary objective of copyright is not to reward the labor of authors, but to promote the Progress of Science and useful Arts.’ To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by a work. This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art.”

⁴⁶² Copyright protects authors of original works against the literal and non-literal copying of their works, in order to prevent immaterial variations in the expression to avoid liability for copyright infringement. A proper application of the idea/expression dichotomy is however a very complex and/or arbitrary task, which requires to distinguish between the conceptual idea of a work (as such not protected by copyright law) and the more detailed idea or the structure of the work (indirectly protected by extending copyright protection to also cover substantial non-literal similarities). See, in particular, NIMMER, M. B. & NIMMER, D. (1963-85) *Nimmer on Copyright: A Treatise on the Law of Literary, Music and Artistic Property, and the Protection of Ideas*, New York, Matthew Bender & Co., distinguishing between “fragmented literal similarity” and “comprehensive non-literal similarity;”

As a general rule, therefore, the object of the copyright can be said to lie somewhere in between the work_t and the expression_t (as these two entities have been defined by the FRBR).

Yet, although the scope of copyright protection may ultimately refer to more than one expression_t, the actual expression_t is not, as such, unconditionally nor absolutely protected. On the one hand, since copyright law only protects against the actual copying of a work,⁴⁶³ the independent making of an identical or substantially similar expression_t would not necessarily amount to copyright infringement. On the other hand, given that the copyright only refers to the 'original expression' of a work,⁴⁶⁴ whenever a work incorporates facts or elements that have been taken from the public domain, certain parts of the expression_t will consequently not be protected.⁴⁶⁵ For instance, a work of history containing historical data and documents will be granted protection only over the new and original expression of the work, whereas the factual content and the recycled expressions will be left unprotected.

In addition, although limited to very few jurisdictions,⁴⁶⁶ the manifestation_t may sometimes be eligible for copyright protection whenever the copyright regime allows for the protection of typographical arrangements of published editions.⁴⁶⁷ In this case, however, protection is not granted to the content, but only to the style, composition, layout and general appearance of the work. As such, the copyright does not pertain to the author of the work but is instead owned by the publisher or by anyone who can be regarded as the author of the

⁴⁶³ Substantial similarity is a necessary but as such insufficient to prove copyright infringement. Copyright, in fact, has originally been conceived as a means to reduce free-riding on the creative efforts of authors. Since the production of an independent creation requires an equal amount of creative effort, it does not amount to free-riding and should therefore not be regarded as copyright infringement. Besides, if independent creations were actionable, the necessity of checking whether a new work may inadvertently infringe the copyright in another work would drastically increase the costs of creating a work without necessarily increasing the expected returns from the work, thereby reducing the incentives for authors to engage in creative activity. See: LANDES, W. M. & POSNER, R. A. (1989) An Economic Analysis of Copyright Law. *The Journal of Legal Studies*, 18.

⁴⁶⁴ The original expression of a work is that which originates from the author of the work. If the expression incorporates pieces of content that do not originate from the author (e.g. mere facts or content taken from the public domain), they will not be covered by the copyright regime. See ABRAMS, H. B. (1992) Originality and Creativity in Copyright Law. *Law and Contemporary Problems*, 55.

⁴⁶⁵ Copyright protects any original work of authorship, but the level of protection may vary according to whether the work involves a high or a low authorship. The scope of protection should be larger in works of high authorship which strongly reflect the personality of the author, but narrower in works of low authorship (e.g. informational works) which embody only a minimal aspect of the personality of the author. GINSBURG, J. C. (1990) Creation and Commercial Value: Copyright Protection of Works of Information. *Columbia Law Review*, 90.

⁴⁶⁶ In the absence of international obligations to protect this particular type of works, not too many jurisdictions have decided to extend copyright protection to the typographical arrangements of published editions, but see, e.g. the UK Copyright, Designs and Patents Act of 1988, section 1(1)(c); the New Zealand Copyright Act of 1994, section 14(1); the Hong Kong Copyright Ordinance Law section 2(c). The US and most civil law countries do not regard typographical arrangements as a copyrightable subject matter.

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typographical arrangement.⁴⁶⁸ Moreover, in view of the entrepreneurial nature of the work, the duration is generally shorter than that of other works of authorship⁴⁶⁹ and no moral rights are assigned. As a result, in any jurisdiction which recognizes a protection for typographical arrangements, photocopying or scanning published material would amount to an infringement of both the copyright in the expression_t and the copyright in the manifestation_t of the work.

Lastly, the tangible item_t incorporating a copyright work is automatically protected upon creation.⁴⁷⁰ The protection, however, does not refer to the item_t as such, but only to the expression_t (and sometimes the manifestation_t) embodied into the item_t.

The conventional notions of physical property do play an important, albeit often unrecognized role in the establishment of the current copyright regime.⁴⁷¹ On the one hand, the scope of standard proprietary rights is, to some extent, constrained by the provisions of the copyright regime. The exercise of the proprietary rights vesting into any legitimately purchased item_t are in fact limited to the extent that the usage thereof would otherwise conflict with the copyright vesting in the work_t, the expression_t, or the manifestation_t.⁴⁷² On the other hand, the scope of the exclusive rights granted under copyright law is itself limited insofar as they would otherwise impinge upon the standard understanding of physical property.⁴⁷³

⁴⁶⁸The copyright in the typographical arrangement of a published edition vests in the publisher of the work. See the UK, section 9(2)(d) of the Copyright, Designs and Patents Act 1988, and Hong Kong, section 11(2)(e) of the Copyright Ordinance Law.

⁴⁶⁹Copyright in the typographical arrangement of a published edition lasts for the period of 25 years from the end of the calendar year in which the edition was first published in the UK (section 15 of the Copyright, Designs and Patents Act of 1988), in New Zealand (section 25 of the Copyright Act of 1994), and in Hong Kong (section 21 of the Copyright Ordinance Law).

⁴⁷⁰ In some jurisdictions, the production of an item is even a mandatory requirement for copyright protection to arise. See the various copyright regimes that consider the fixation of the work as a mandatory requirement for copyright protection (e.g. the US, the UK, Canada, and most other countries with a common law tradition).

⁴⁷¹ The rights that can be exerted by the owner of the particular copy of a work are primarily defined by the law of personal property, which have subsequently been refined by the provisions of the copyright regime which may impose a number of limits over the manner in which and the extent to which these rights can actually be put into practice. For a more detailed analysis of the extent to which the laws of personal property have actually contributed to shaping the implementation of the copyright regime, see LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership*. *William and Mary Law Review*, 32.

⁴⁷²Copyright owners are granted with a series of exclusive rights over the expression of their works and have therefore a claim of partial ownership on every physical embodiment that incorporates the expression of their works. The copyright regime has therefore been sometimes criticized on the grounds that it impinges upon the scope of property rights in tangible things by restricting the ways in which physical property can be legitimately put into use. See, in particular, KINSELLA, N. S. (2001) *Against Intellectual Property*. *Journal of Libertarian Studies*, 15.

⁴⁷³ The scope of copyright law is ultimately determined by the default understanding of what the ownership of physical property fundamentally entails. The type and the extent of the exclusive rights granted to the owner of the copyright in a work have therefore been designed around the common understanding of the rights that generally derive from the ownership of physical property. Copyright law has been intended to operate in combination with the default rules of the property regime, and therefore only expressly stipulates the provisions necessary to deviate from the standard principles of property law or to preserve them against the intrusion of the copyright regime. See LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership*. *William and Mary Law Review*, 32.

Even within the copyright regime itself, the concept of physical ownership has a significant influence upon the implementation of the law. In particular, with regard to the exclusive right of distribution, it is commonly understood that, in order for the copyright regime not to enter into an irresolvable conflict with the general principles of property law, and in order to prevent any unnecessary restraints of trade, the right should be regarded as being exhausted after it has been exercised once.⁴⁷⁴ Exhaustion, however, does not affect the right as a whole, but only extinguish it against that particular copy of the work which has been legitimately transferred to a third party. As such, the doctrine of exhaustion ultimately applies at the level of the item_t. After the first sale has been made, only that particular item_t can be freely redistributed without the consent of the copyright owner.

These concepts, however, do not apply in the case of digital property. In view of the distinctive properties of digital media, the standard notions of physical property cannot be applied by analogy into the digital realm.⁴⁷⁵ As such, the principle of exhaustion is therefore incapable to operate in the digital environment, for a variety of reasons. First of all, the immateriality of a digital copy allows for it to be governed by different rules than those which regulate the transfer of physical property. Some of the justifications for limiting the extent to which the copyright vesting in a work may impinge upon the proprietary rights vesting in the physical instances of that work may, therefore, turn out to be less relevant when it comes to the digital world. Moreover, in the digital environment, not only has it become very difficult to identify the national boundaries that subsist underneath the Internet network,⁴⁷⁶ but it may also have become meaningless to do so. Indeed, the transfer of a digital item_t from one computer to another would necessarily produce a new item_t, for which the exclusive right of distribution has not yet been exhausted.⁴⁷⁷

⁴⁷⁴ For a more detailed overview of how the doctrine of exhaustion affects the scope of copyright protection, and how it applies differently in the physical and in the digital environment, see *supra* Part I. Chapter 1: Copyright law. Section 1.B: Limits of protection.

⁴⁷⁵ Even though both physical and digital property share certain common characteristics, some of the standard properties of physical property (such as scarcity, exclusivity and the quality to persist over time) do not pertain to the digital realm unless they have been emulated by technological or legal means. Digital assets are by default non-rival and non-excludable; they can be easily revised or modified without losing the original assets, as well as being reproduced at virtually no cost. As such, digital property is to some extent more akin to intangible property than it is to physical property and should therefore be regulated by different rules and principles. See e.g. DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press.

⁴⁷⁶ The global scope of the Internet network and the digital nature of data in the digital environment make it difficult to properly identify the place into which a work has been distributed, as well as to control the further distribution thereof. The correct application of national and/or regional exhaustion may therefore be impaired in the digital environment. For a more general overview, see HUGENHOLTZ, B. (1996) Adapting copyright to the information superhighway. IN HUGENHOLTZ, P. B. (Ed.) *The Future of Copyright in a Digital Environment*. The Hague, Kluwer.

⁴⁷⁷ With the advent of the digital technologies, allowing for the digitalization of any kind of content, the right of distribution has become inherently related to the right of reproduction. Accordingly, even a country that endorses the international exhaustion of the right of distribution (but of not the right of reproduction) would jeopardize the interests of right holders if the same principles of exhaustion were to apply also in the digital environment, since the exhaustion of the right of distribution would necessarily imply also the exhaustion of the right of reproduction. For a more detailed analysis of the various issues relating to the application of the

To conclude, the relationship that subsists between the different entities that the copyright regime refers to and the various entities identified within the FRBR framework is not perfectly clear. Although the terminology employed by the FRBR is often the same as the one used in the framework of copyright law, the meaning of the entities they refer to fundamentally differs on a variety of aspects. As a result, many of the concepts identified within the FRBR framework have been either too widely or narrowly defined to actually be used as a reference to identify the object of the copyright.

Accordingly, while it may provide a basis for the identification of the various aspects of a work, the FRBR is, as such, incapable of properly describing the scope of copyright protection. Yet, in view of its overall simplicity and flexibility, the FRBR framework could nevertheless be employed in the context of the licensing of rights to determine the scope and object of the rights and obligations that are being assigned to every licensee.

SECTION 2

THE OBJECT OF THE RIGHTS

As it has been illustrated earlier, a work can be subdivided into of four different layers: the *work_t* as an intellectual creation, the *expression_t* as a particular articulation of the *work_t*, the *manifestation_t* as the embodiment of the *expression_t* into a particular medium, and, finally, the *item_t* as an individual copy of the *manifestation_t*.

At any of these layers, different rights pertaining to different right holders may be recognized. In particular, although generally owned by the same entity, the rights vesting in the *expression_t* may be owned by someone other than the holder of the rights in the *work_t* (e.g. in the case of translations or other derivative works).⁴⁷⁸ Moreover, in any jurisdiction that recognizes protection in the typographical arrangement of a published edition, the publisher would be the owner of that copyright, although not necessarily the owner of the copyright in the *work_t* or in the *expression_t*.⁴⁷⁹ Finally the purchaser of an *item_t* of the work will generally

doctrine of exhaustion into the digital environment, see: UNESCO (2002) The exhaustion of rights in the digital environment. *Copyright Bulletin*.

⁴⁷⁸ Certain derivative works may display a sufficient amount of originality so as to qualify for copyright protection themselves. See article 2(3) of the Berne Convention for the Protection of Literary and Artistic Works: “Translations, adaptations, arrangements of music and other alterations of a literary or artistic work shall be protected as original works without prejudice to the copyright in the original work.”

⁴⁷⁹ In every copyright regime which provides for the typographical arrangements of published, additional protection is granted not to the content, but to the style, composition, layout and general appearance of the work. The copyright does not therefore pertain to the author of the work but is instead owned by the publisher or by anyone who may be regarded as the author of the typographical arrangement. See, e.g. in the UK, section 9(2)(d) of the Copyright, Designs and Patents Act 1988, and in Hong Kong, section 11(2)(e) of the Copyright Ordinance Law. Moreover, in view of the entrepreneurial nature of the work, the copyright in the typographical arrangement of a published edition is generally shorter than that of other works of authorship. See e.g. in the UK (section 15 of the Copyright, Designs and Patents Act of 1988), in New Zealand (section 25 of the Copyright Act of 1994), and in Hong Kong (section 21 of the Copyright Ordinance Law), according to which the copyright only lasts for the period of 25 years from the end of the calendar year in which the edition was first published.

be the owner of the proprietary rights in that particular instance of the work_t, the exploitation of which may however be restrained by the rights vesting in any other layer of the work.⁴⁸⁰

Regardless of the layer of abstraction that is taken into account, the owners of the copyright in a work are endowed with a series of exclusive rights over the use of certain aspects of that work, which they can assign, license, or otherwise transfer to third parties, either in whole or in part, according to particular terms and conditions. In fact, with the exception of moral rights, all of the exclusive rights vesting in a copyrighted work can be licensed or assigned to third parties by way of contractual agreements.

However, given that the copyright can be subdivided indefinitely, any of these rights can be transferred either in part or as a whole - and the exercise thereof can be precisely regulated by contractual means.⁴⁸¹ In particular, right holders have complete discretion as to whether to transfer their rights to the work as a whole, or only to a particular aspect of the work. As such, the transfer of rights and the exploitation thereof is often governed by particular terms and conditions which may impose a more or less stringent set of restrictions on the licensees according to the type of exploitation they refer to and to the number of limitations they provide for (e.g. geographical restrictions, commercial conditions, etc).

Although they have a similar set of rights, rights holders are given more room for discretion with regard to the licensing of rights in digital content. Given that it can be encoded into a variety of digital files, whose exploitation can be regulated by a variety of technological measures, it becomes possible to release a digital work under a copyright license that exclusively allows for the exploitation of a particular instance of the work according to specific terms and conditions which can be automatically enforced by a technological device.

As a general rule, the provisions of a copyright license must identify, on the one hand, the object of the rights being licensed, and, on the other hand, the extent to which they can be legitimately exercised by the licensees. As such, the scope of a copyright license ultimately depends on three variables: (1) the exclusive rights that are being licensed (i.e. the exclusive right of reproduction, distribution, communication to the public, etc); (2) the actual object of these rights (i.e. whether they refer to the work_t, the expression_t, the manifestation_t, or only to a specific item_t); and (3) any supplementary conditions that regulate the manner in which these rights can be enjoyed (i.e. any temporal or geographical restriction).

⁴⁸⁰ A number of conflicts may potentially arise between the owner of the copyright in a work and the owner of any given copy of the work. In spite of the distinction between ownership of the intangible work of authorship and ownership of the medium by which the work is being conveyed, the exercise of the economic and/or moral rights of the copyright regime may interfere with the exercise of the proprietary rights in the physical manifestation of the work. See e.g. GINSBURG, J. C. (1992) Conflicts of Copyright Ownership Between Authors and Owners of Original Artworks: An Essay in Comparative and International Private Law. *Columbia Journal of Law & the Arts*, 17.

⁴⁸¹ As a general rule, the copyright vesting in a work can be regarded as a bundle of rights, which can be subdivided into smaller pieces in order to be transferred separately to different parties. Because the copyright is infinitely divisible, the licensed rights can be limited according to time, geography, language, type of use, market segment, channels of distribution, etc. See CONTRACTOR, F. J. (2001) Valuing Intellectual Property and Corporate Expertise. *Valuation of intangible assets in global operations*. Praeger. See also Section 201(d) of the US Copyright Act of 1976, which specifically provides that (1) the ownership of a copyright may be transferred in whole or in part; and (2) any of the exclusive rights comprised in a copyright, including any subdivision of any of the rights [...] may be transferred.

By properly indicating the scope and object of the rights granted under a copyright license, the copyright owner is therefore able to precisely determine the manner and the extent to which these exclusive rights can be legitimately exploited by their respective licensees. For instance, the exclusive right of reproduction could theoretically be granted either at the level of the *expression_t* (i.e. if a particular *expression_t* can be reproduced in any manner or form), at the level of the *manifestation_t* (i.e. if the *work_t* can only be reproduced in a particular format) or at the level of the *item_t* (in any case in which a new copy of the work can be legitimately produced only if it is directly derived from a particular copy thereof). In addition, the scope of the rights could be further refined through a series of arbitrary conditions or restrictions that would allow for e.g. the right of reproduction to be exercised only in a specific set of circumstances (i.e. reproduction for non-commercial purposes, distribution in a particular geographical location, etc).

In view of their structural relationship, acquiring the right to exploit any of the constitutive elements of a work necessarily implies the right to exploit every other entity that subsists at any lower layer of abstraction.⁴⁸²

Accordingly, a copyright license designed to transfer the copyright in the *work_t* as a whole will ultimately enable the licensee with the possibility to produce new *expressions_t* and new *manifestations_t*, as well as to incorporate the resulting creations into an indefinite number of *items_t*. Instead, a copyright license that is designed to merely transfer the copyright vesting in the *expression_t* would normally allow for the making of new *manifestations_t* incorporating that very same *expression_t*, but would necessarily preclude the licensee from producing a different *expression_t* of the same *work_t*, since that would otherwise infringe upon the copyright vesting in the *work_t*.⁴⁸³ Most of the time, therefore, the making of derivative works would necessarily involve the right to reproduce substantial parts of one particular *expression_t*, or, more generally, the right to the reproduction and to the adaptation of the *work_t* as a whole. Conversely, a copyright license designed to transfer the copyright in a particular *manifestation_t* would fundamentally allow for the licensee to produce new instances of that particular *manifestation_t* into a physical medium, but would prevent the

⁴⁸² A work can be released under an indefinite number of licenses which allow for the exploitation of different aspects of the work. For instance, the owner of the copyright in a literary work may grant a license on the work as a whole to a particular author who is willing to produce a derivative work (e.g. a translation of the work, or a critical edition thereof, etc). The same work may however also be released under a variety of different licenses, each specifically designed to satisfy the demands of the different parties involved in the commercial exploitation of the work. Accordingly, an editor may acquire a copyright license that refers exclusively to the expression of the work, thereby obtaining the capacity to legitimately produce and commercialize various editions of the work. That editor may in turn sublicense these rights to a particular publisher whose function is to produce a series of items incorporating the work, by way of licensing all the relevant rights only with regard to a particular manifestation of the work. For a more detailed overview of the practice of copyright licensing in the publishing industry, see e.g. STRAUCH, B. (1996) *Current Legal Issues in Publishing*, Taylor & Francis Inc.

⁴⁸³ The making of a derivative work consists in taking the expression of one or more existing works, and either incorporate it into a new work or partially modify it so as to create a derivative expression of the same work. Whether the derivative work is infringing upon the copyright vesting in the original work depends upon a large number of factors and cannot be objectively determined without taking into account the specific circumstances of the case. In any case where the resulting work is substantially similar to another work, either in its expression or in its general structure or conception, the making of that derivative work will inevitably constitute an infringement of both the exclusive right of reproduction and the exclusive right of adaptation that have been granted to the owner of the copyright in the original work. For more details, see e.g. COHEN, A. B. (1999a) When does a Work Infringe the Derivative Works Right of a Copyright Owner. *Cardozo Arts & Entertainment Law Journal*, 17.

making of new and distinct manifestations_t of the same work_t. Finally, whenever the object of a copyright license relates to a particular item_t, instead, the rights that the licensees have been granted with can only be enjoyed with regard to that specific instance of the work_t.

As a general rule, therefore, the object of commercial copyright licenses is likely to refer either to (a) the work_t as a general concept, whenever the exploitation thereof would require the making of derivative works, (b) the expression_t, whenever only the production of different manifestations_t is involved, (c) the manifestation_t, whenever the licensee is exclusively concerned with the making of individual copies of the work – whereas the object of most end-user licensing agreements is likely to refer only to one specific item_t.

To be sure, publishers willing to exploit a literary work on a commercial scale will generally be granted with the ability to produce an indefinite number of copies which may have to incorporate either a particular expression_t or a particular manifestation_t, depending upon the terms and conditions of the copyright license under which the work has been released. Conversely, anyone willing to produce a derivative work (involving e.g. the translation of the work into a different language, or the adaptation thereof into a different medium of expression) will necessarily produce a new expression_t and should as such acquire a series of rights over the work_t, as opposed to the expression_t or manifestation_t. Insofar as their object subsists at higher levels of abstraction, the structure of most copyright licenses concerned with the commercial exploitation of a work is unlikely to differ according to whether they refer to the exploitation of a work in the physical or in the digital environment.

Yet, in the framework of copyright law, properly establishing the object of the rights granted under a copyright license is important not only from the perspective of right holders who are ultimately concerned with the commercial exploitation of their works, but also from the perspective of end-users who are merely concerned with the consumption of these works.

As opposed to commercial licenses, in the case of end-user licenses, the majority of licensees are only concerned with the rights vesting in a particular item_t of the work. As such, any user willing to consume a work as a personal form of entertainment only needs to be provided with the right to access the content of the work. In particular, whether they relate to a physical or a digital work, the object of most EULAs is likely to remain the same. In the context of physical works, most of the rights and obligations granted by an end-user licensing agreement are specific to that particular copy of the work that is being transferred. Likewise, in the digital environment, it is the copy that ultimately constitutes the object of the license (i.e. that particular copy of the work that can be exploited according to the terms and conditions of the license).⁴⁸⁴

⁴⁸⁴ See e.g. the iTunes End-User Licensing Agreement, section 10(a): “Products may only be downloaded once; after being downloaded, they cannot be replaced if lost for any reason. Once a Product is purchased or rented (as applicable) and you receive the Product, it is your responsibility not to lose, destroy, or damage the Product, and Apple shall be without liability to you in the event of any loss, destruction, or damage.” Accordingly, two identical copies of the Work are considered as two different products for the purposes of the licensing agreement and may therefore not be used interchangeably. In fact, by entering into the license agreement, users do not obtain the right to exploit the Work as such, but only the right to exploit that particular copy of the Work (i.e. the Product).

Accordingly, by the mere fact of acquiring a copyright license, end-users obtain the right to use and to consume a particular ‘copy’ of the work, although they do not necessarily acquire any right over the manifestation_t, the expression_t, or the work_t. Indeed, by virtue of possessing the physical copy of a work, users are entitled to exploit that copy just like any other piece of property (i.e. in accordance with the standard principles of property law), but only to the extent that this particular act has not been expressly prohibited by any other body of law.⁴⁸⁵ For instance, with regard to Hamlet by Shakespeare, the owners of a particular copy of the book only enjoy the right to dispose of their copy to the extent that they do not violate the copyright vesting in the manifestation_t, expression_t or work_t that has been incorporated into the item_t.⁴⁸⁶ Even though they are perfectly entitled to access and use their particular copy of the book, to lend it to someone else, or even to sell it to third parties, end-users cannot however exercise these rights over a different copy of the book.⁴⁸⁷

From the perspective of end-users, it is important to determine the extent to which a user is legitimately entitled to consume the different instances of a work. The main concerns are, therefore, to identify the scope of the rights and obligations acquired through the copyright license and to establish the scope of a particular copy of the work within the framework of copyright law.

⁴⁸⁵ While intellectual property laws impose obvious restrictions over the manner in which and the extent to which a particular piece of property can be disposed of, limitations on the exercise of property rights in physical property are the rule rather than the exception. For instance, the owner of a weapon may not make use of that property in order to harm anyone, the exploitation of land by is usually restrained by laws on zoning, easements and nuisance, etc. For a broader overview on the similarities, differences, and interrelations between physical property and intellectual property, see e.g. HUGHES, J. (1988) *The Philosophy of Intellectual Property*. *Georgetown Law Journal*, 77.

⁴⁸⁶ Ownership of the physical copy of a work automatically gives users the possibility to exercise a certain number of activities with respect to that particular copy, such as, for instance, the ability to read, play, use, or otherwise access the content that has been embodied into the physical item, as well as the right to subsequently transfer that particular item to any third party. However, the right to exploit one particular copy of the work does not necessarily extend to the right to exploit the manifestation, the expression or the general concept of the work. In particular, the prohibitions concerning the economic exploitation of a work that are provided by the copyright regime (i.e. the production, reproduction and distribution of copies, the public performance or the making available of the work, and, finally, the making of derivative works) are still to be respected, unless they have been expressly surrendered by their corresponding right holders. For a broader overview of the various limitations on the use of physical property that have been introduced by intellectual property laws, see, in particular, KINSELLA, N. S. (2001) *Against Intellectual Property*. *Journal of Libertarian Studies*, 15.

⁴⁸⁷ For instance, every user who possesses a copy of the Hamlet automatically acquires the right to read it as many times as the physical copy allows for (e.g. until the book itself begins to deteriorate). This right to access the content of the work as it has been incorporated into the physical copy does not however result from an implied license between the copyright owner and the owner of the copy, but merely from the natural principles of physical property. In other words, the right to access the content of an item fundamentally subsists in virtue of the mere possession thereof, regardless of how the possession of that item has actually been obtained (e.g. whether it has been legitimately acquired or not). Similarly, the ability to transfer the possession of a physical copy to any third party (e.g. through sale, gift, lease or loan) is an inherent consequence of the actual possession of the physical item, which has however also been expressly recognized by the law, in view of the fact that the exercise of that right would otherwise constitute a violation of the exclusive right of distribution, as provided by copyright law. To the extent that these rights are directly correlated to the possession of a physical item, they are therefore bound to that particular copy and do not apply to any other copy of the same work. For a more detailed overview of the rights resulting from the possession of the physical copy of a work, see, for instance, LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership*. *William and Mary Law Review*, 32.

While it has always been regarded as a rather obvious task, identifying the copy of a work according to the provisions of the copyright regime may actually become a very difficult and intricate process, especially in the context of digital works.

SECTION 3

THE CONCEPT OF A COPY

The copy of a work constitutes the ultimate unit of consumption.⁴⁸⁸ From the point of view of end-users, providing a proper definition of the concept is therefore extremely important because it is directly associated to the manner and the extent to which they can enjoy and experience a work.

Being the only entity that does actually exist in the real world, the item_t is perhaps the best candidate to qualify as the ‘copy’ of a work for the purposes of copyright law. By reason of its physicality, the item_t is in fact the only constitutive element of the work that is capable of conveying information to the public. Moreover, to the extent that it is believed to retain most of its physical attributes over time, the item_t can be easily and consistently recognized as a distinct entity that persists over time. It therefore follows that, if, according to copyright law, the copy represents the ultimate unit of analysis⁴⁸⁹ - when regarded through the framework of the FRBR - the concept of a copy should ultimately vest in the item_t as the ultimate carrier of information.

Specifically, the FRBR framework can fundamentally be regarded as a taxonomy that categorizes entities from the most generic to the specific.⁴⁹⁰ Yet, none of the entities identified within the FRBR are actually related to each other through a relationship of subsumption (i.e. the so called ‘is a’ relationship) commonly found in

⁴⁸⁸ Copyright has always focused on the physical copy (i.e. item) as the basic unit of consumption and as the decisive criterion for copyright infringement. Traditionally, works have in fact always been recorded on tangible things (e.g. books, journals, photographs, records, etc) which ultimately gave users the ability to enjoy and to consume the work. In the physical world, therefore, the sale of a physical copy has always been regarded as the basic means of exploiting a creative work. Users could legitimately consume a work by merely purchasing the object into which the work had been recorded, without the need to purchase any additional copyright license. In the digital world, the digital copy has replaced the physical copy of a work, and while the item is no longer easily identifiable, it still constitutes the only mechanism allowing for the consumption of a work in the real world. See Ibid.

⁴⁸⁹ Indeed, this may be the reason why certain implementations of the copyright regime actually require a work to be fixed into a physical medium of expression before it can be eligible for protection. See e.g. section 101 of the US Copyright Code of 1976, and the corresponding provisions in the UK, Canada, as well as many other common law countries.

⁴⁹⁰ Taxonomy is concerned with the formal classification of things according to the various degrees to which they are related to each other. The goal is to identify the various similarities and dissimilarities that can be observed amongst entities of a different kind. This is achieved by grouping things that have some features in common into particular categories and progressively arranging these categories into larger groups until a complete classification is obtained. A hierarchical taxonomy progresses from the general to the specific, in the sense that every node represents a particular category of things whose properties apply to all the nodes below. See e.g. JARDINE, C. J., JARDINE, N. & SIBSON, R. (1967) The structure and construction of taxonomic hierarchies. *Mathematical Biosciences*, 1, 173-179.

other taxonomies. The ‘is a’ relationship concerns the connection between a type and a subtype, or, from an estentional perspective, between a set and a subset (consider for instance the connection between the concept of an animal and the concept of a mammal). In the context of the FRBR, however, an *expression_t* is not a special type of work, a *manifestation_t* is not a particular kind of *expression_t*, nor is an item a specific kind of *manifestation_t*. Even though each and every entity can be positioned into the FRBR framework according to a particular hierarchical order, the *item_t* cannot be regarded as a *manifestation_t* but merely as a separate entity that incorporates a *manifestation_t*; the *manifestation_t* cannot as such qualify as an *expression_t*, but only as a particular concretization of an *expression_t*; and the *expression_t* cannot in turn be regarded as a *work_t* in its own right, but only as a particular realization of a *work_t*.

Yet, the structural relationship that subsists between the different entities of the FRBR is such that any entity that belongs to a lower level category necessarily incorporates each and every one of the higher-level categories. As such, the *work_t* basically constitutes the ultimate type to which any other entity of that type necessarily refers. The *expression_t* and the *manifestation_t* can be regarded as intermediate types – i.e. entities which other entities may refer to but which may in turn refer to an entity of a higher type; whereas the *item_t* basically constitutes the lowest layer of abstraction to which no other entity refers. Accordingly, although no express distinction has been made between the various entities that populate the FRBR framework, the *work_t*, the *expression_t* and the *manifestation_t* could theoretically be regarded as fundamental ‘types’, whereas the *item_t* could basically be described as a ‘token’.⁴⁹¹ Indeed, the *item_t* does not add any specificity to the taxonomy, but exclusively subsists as a member of every other category. In other words, saying that an *item_t* is of a certain type does not provide any additional information with regard to the *item_t per se*, but is merely equivalent to saying that it incorporates a particular *work_t*, a particular *expression_t* or a particular *manifestation_t* of that type.

Every time an *item_t* is produced, it necessarily assumes a certain manifestation-type (i.e. it exemplifies a particular *manifestation_t*) which automatically inherits all the properties of the types higher up in the hierarchy.⁴⁹² Just like the species of an organism cannot be changed during the course of its life, the type of an *item_t* cannot be changed without altering the inherent nature of the *item_t*. After it has been produced, an *item_t* will therefore be bound to one particular *manifestation_t* for the entire course of its life and regardless of whether some of its essential properties have been modified.⁴⁹³ Moreover, in spite of any physical change

⁴⁹¹ A distinction must be made between intellectual works as ‘types’ and physical objects as ‘tokens’. Tokens are basic entities of a certain type, which therefore inherit all the properties of that type, although they may also features other properties which distinguish them from other tokens of the same type. According, while Hamlet as a literary work is essentially a type, and so is the expression and the manifestation thereof, any given copy of the Hamlet as it has been exemplified into a tangible book can ultimately be regarded as a ‘token’. For more details on the distinction between types and tokens, see WOLLHEIM, R. (1980) *Art and its objects*, Cambridge University Press.

⁴⁹² The FRBR framework establishes a system according to which the relationships between the various entities that constitute the different aspects of a work are organized into a systematic and hierarchical structure. As a result of the taxonomic approach of the FRBR, every entity at any given level in the hierarchy necessarily inherits the properties of all the levels above it. See MIMNO, D., CRANE, G. & JONES, A. (2005) Hierarchical Catalog Records. *D-Lib Magazine*, 11.

⁴⁹³ An item acquires its own type at the moment in which it comes to existence. Accordingly, any event, whether or not it was intended, that occurs during the making of an item and results in the production of a different exemplar of the item will

that the item_t may eventually incur, it will nonetheless be recognized as the very same entity by virtue of the persistence of its other physical properties.

Amongst the various entities that populate the FRBR framework, the item_t is therefore the best candidate to qualify as a particular copy of the work. In the mind of consumers, in fact, the copy of a work fundamentally qualifies as a particular instance of the work (i.e. a token) which represents the way in which the work has been materialized into the physical world.

The identity of a copy may however differ according to the context of analysis. In view of the specificities of digital media, in fact, if it were to be applied by analogy into the digital environment, the concept of the item_t as a copy may lead to a series of problems and concerns. The reason is that the item_t does not retain any of its physical characteristics over time. As a consequence, if the physical properties of the item_t were the main factor to determine the identity of a copy in the digital environment, users may no longer be able to access and to dispose freely of their digital works, because any exploitation thereof would necessarily involve the making of a new item_t that would distinguish itself from the original copy of the work in view of its distinct physical qualities.⁴⁹⁴

SECTION 4

DIGITAL CONCERNS

As a general rule, any original work of authorship is protected under the copyright regime regardless of the environment it subsists in. The law does not in fact distinguish between a physical and a digital work in order to determine whether or not the work qualifies for protection. Yet, the manner in which and the extent to which the exploitation of a work is regulated under the copyright regime may fundamentally differ according to the context of analysis. Accordingly, although the work_t, the expression_t and the manifestation_t are eligible for copyright protection both in the physical and in the digital environment, they may be protected to a different degree according to whether they relate to a physical or a digital work. The relationship that subsists between the copyright regime and the constitutive elements of a work may therefore need to be revised in order to account for the specificities of the digital environment.

automatically give rise to a new manifestation that will constitute the type of that item. Conversely, any changes to an item that occur after the process of production will not affect the type of the item. See IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

⁴⁹⁴ In the digital environment, even the most legitimate use of a digital work necessarily involves the making of a new item of the work. In view of the way the Internet and digital devices internally operate, if the concept of a copy were to be identified by the physical attributes of the item into which the work has been originally embodied, the mere fact of accessing that particular copy of the work or the simple fact of transferring it from one device to the other would automatically result in the production of a new copy of the work, as a result of a new item having been made. For more details, see e.g. DAVIS, R. (2000) *The Digital Dilemma: Intellectual Property in the Information Age*, Washington, National Academy Press.

With the advent of Internet and digital technologies, the copyright regime as it had been implemented in most jurisdictions was no longer able to cope with the new forms of exploitation that emerged in the digital environment. Copyright law has thus been reformed in order to better embrace the specificities of the new environment.⁴⁹⁵

However, to the extent that copyright law recognized the fact that the digital representation of a work is fundamentally different from its physical representation, a different level of protection has been granted to the different aspects of a work according to the medium into which it has been incorporated. As a result, even though one of the primary objectives of the legislative reforms was to ensure that the law would be equally applicable in both worlds, the way in which the law has been reformed for the digital environment is such that the copyright regime no longer provides the same kind of protection for physical and digital copies.

First of all, with regard to the expression_t, given its intangible character, it should theoretically be granted with a similar level of protection regardless of whether it has been embodied into a physical or a digital copy. Yet, it is also necessary to take into account a series of factors which may considerably affect the way and the extent to which a work can be legitimately exploited. In particular, the copyright regime of every jurisdiction requires that the scope of the exclusive rights be limited to the extent necessary to leave room for a series of copyright exemptions.⁴⁹⁶ The scope of these limitations, as they apply to the digital environment, has been consequently limited by the recent legislative reforms of the copyright regime.⁴⁹⁷ An important factor is the additional layer of protection which has been granted to every digital work whose access and/or use is regulated by technological means (i.e. the anti-circumvention provisions).⁴⁹⁸ In fact, while the law prohibits the

⁴⁹⁵ See, in particular, the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonographs Treaty (WPPT) of 1996 which introduced new provisions to protect the rights of copyright holders into the digital world. The obligations of the WIPO Treaties have been resolved through the enactment of the Digital Millennium Copyright ACT (DMCA) in the USA and in Europe with the implementation of Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society. For more details on how the copyright regime has been reformed in different jurisdictions, see LIPTON, J. (2001) Copyright in the Digital Age: a Comparative Survey. *Rutgers Computer & Technology Law Journal*, 27.

⁴⁹⁶ The Berne Convention allows for every member state to introduce limitations on the scope of the exclusive rights in certain special cases which do not conflict with a normal exploitation of the work and do not unreasonably prejudice the legitimate interests of the author. See, in particular, Articles 9, 10, 10bis and 11 of the Berne Convention. Every jurisdiction has implemented a particular mechanism in order to some extent limit the rights granted by default to the copyright holders. For instance, most of the European member states have introduced a predetermined list of specific exemptions, where the USA has opted for a more flexible system based on the principles of fair uses as stipulated in section 107 of the US Copyright Act.

⁴⁹⁷ For instance, with regard to the digital environment, the European Directive 2001/29/EC provides a new series of exceptions and limitations to the exclusive rights of the copyright regime, which comprises a list of 21 exceptions of which only the one concerning temporary and incidental copying stipulated in Article 5(1) has to be mandatorily implemented by all Member States. The other 20 limitations are optional, in the sense that Member States are free to decide whether or not to implement into their national legislations. The list is however essentially restrictive in nature: Member States are only allowed to implement exceptions from that list and are thus prevented from introducing any additional limitations to the copyright regime, unless they were already present in the national legislation.

⁴⁹⁸ The WIPO Treaties require that every member state implement adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with their rights in copyright works (article 11 of the WCT and article 18 of the WPPT). These provisions have been implemented in the copyright regime of all contracting

circumvention of technological measures of protection for any purpose whatsoever,⁴⁹⁹ the copyright regime only provides for a rather limited range of exceptions to compensate for the additional protection granted to these works.⁵⁰⁰ As a result, not only does the scope of the copyright regime considerably differ according to whether a work_t subsists in the physical or in the digital environment, but even within the same context of analysis, a different degree of protection will be granted to the expression_t according to whether or not it has been incorporated into a digital file together with specific technological measures of protection.

parties, such as, for instance, in the USA through the DMCA which provides a basic prohibition against (a) the circumvention of technological measures that effectively control access to (b) a work protected under copyright law (c) without the consent of the copyright owner (section 1201); and in Europe through the Directive 2001/29/EC which provides a basic form of protection against (a) the circumvention of effective technological measures (b) designed to protect the copyright in a work or other related rights (c) by anyone without the authority to perform such an act (d) but who knowingly does it anyways (article 6).

⁴⁹⁹ The provisions of the DMCA prohibit the unauthorized circumvention of any technological measure that effectively controls access to a copyrighted work, regardless of whether the access thus gained infringes any property rights in the work other than those related to the anti-circumvention laws. The provisions of the DMCA thus make circumvention illegal regardless of whether or not it leads to an act of copyright infringement. These provisions have been therefore criticized by a number of authors on the grounds that they preclude the circumvention of any technological measure of protection associated to a work that is legally protected by copyright law, even when the circumvention thereof is required for users to actually engage into a legitimate exploitation of the work such as fair uses. See, in particular, BENKLER, Y. (1999) Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain. *NYU Law Review*, 74.; OLIVE, B. (2000) Anti-Circumvention and Copyright Management Information: Analysis of New Chapter 12 of the Copyright Act. *North Carolina Journal of Law and Technology*, 1. ; BELLA, P. L. (2004) Defending Cyberproperty. *NYU Law Review*, 79. The provisions of the European Directive are similar in that they prohibit the circumvention of any technological measure designed to prevent or inhibit the infringement of any copyright or related rights, regardless of whether or not the subsequent use of the work would constitute an infringement. Also in the European Union, therefore, the act of circumvention is banned as such and is only indirectly related to copyright infringement. For more details, see FALLENBOCK, M. (2003) On the Technical Protection of Copyright: The Digital Millennium Copyright Act, the European Community Copyright Directive and their Anticircumvention Provisions *International Journal of Communications Law and Policy*.

⁵⁰⁰ In the USA, since the circumvention of anti-circumvention devices is prohibited *per se*, it is not possible to rely upon any of the principles of fair use in order to attempt to perform an act of circumvention. Under section 1201, the DMCA provides a number of exemptions which exclusively apply to digital work protected by effective technological measures and which can eventually justify the circumvention thereof. They relate to a series of special case, including (a) reverse engineering, (b) encryption research, (c) security testing, (d) protection of personally identifying information, (e) activities of non-profit libraries, archives and educational institutions, or (f) law enforcement and intelligence, as well as any activity necessary to ensure (g) the protection of minors. This limited set of exceptions has however been strongly criticized for being much more restrained and less flexible than the standard fair use doctrine, see e.g. NIMMER, D. (2000) A Riff on Fair Use in the Digital Millennium Copyright Act. *University of Pennsylvania Law Review*, 148, 673-742.; COHEN, J. E. (1999b) WIPO Copyright Treaty Implementation in the United States: Will Fair Use Survive? *European Intellectual Property Review*, 236. From the European side, instead, although the circumvention of technological measures of protection is also prohibited *per se*, Article 6(4) of the European Directive nevertheless provides that Member States are under the obligation to take appropriate measures to ensure that right holders make available to beneficiaries of certain exemptions the means for benefiting from these exemptions. According to the same Article, this specific provision does not however apply to works or other subject matter made available to the public on agreed contractual terms in such a way that members of the public may access them from a place and at a time individually chosen by them, which is the case of most digital works released to the public under a particular end-user license. For more details, see CASELLATI, A. M. (2001) The Evolution of Article 6.4 of the European Information Society Copyright Directive. *Colum.-VLA Journal of Law & Arts*, 24. and GASSER, U. & GIRSBERGER, M. (2004) Transposing the Copyright Directive: Legal Protection of Technological Measures in EU Member States. *Berkman Publication Series*. Berkman Center for Internet & Society.

Next, with regard to the manifestation_t of a digital work, although it is not subject to copyright protection as such (save for certain typographical arrangements), some of its elements may nonetheless qualify for protection under the copyright regime. The removal, corruption or manipulation of any component of the manifestation_t is prohibited by law to the extent that it incorporates information concerning the work, the author or the owner of the copyright in the work (i.e. descriptive metadata), as well as any information about the terms and conditions under which the work can be legitimately exploited (i.e. rights metadata).⁵⁰¹

Finally, with reference to the physical items_t, even though they are not, as such, protected by the copyright regime,⁵⁰² the exploitation thereof can be regulated by copyright law for the mere fact that they incorporate a work_t, which itself qualifies for copyright protection.⁵⁰³ Accordingly, even if there are no explicit provisions concerning the way it may be freely disposed of, the item_t can nonetheless be subject to the standard provisions of the copyright regime, to the extent that the exploitation thereof would otherwise infringe upon the copyright vesting in any of the higher layers of the work.

There exists one important difference in the way an item_t can be disposed of according to whether it incorporates a physical or a digital work. In the physical environment, the principle of exhaustion⁵⁰⁴ stipulates

⁵⁰¹ See article 12 of the WIPO Copyright Treaty, which require that every member state provide adequate and effective legal remedies against anyone who knowingly remove, alter or otherwise tamper with any electronic rights management information without the necessary authority to do so, where electronic rights management information is defined as “information that identifies the work, the author of the work, the owner of any rights in the work, or information about the terms and conditions of use of the work, and any numbers or codes that represent such information, when any of these items of information is attached to a copy of a work or appears in connection with the communication of a work to the public.”

⁵⁰² The subject matter of the copyright is the “original work of authorship” fixed into a tangible medium of expression, rather than the tangible medium itself. See e.g. section 202 of the US Copyright Act of 1976 which specifically states that “ownership of a copyright, or of any of the exclusive rights under a copyright, is distinct from ownership of any material object in which the work is embodied.”

⁵⁰³ Although copyright law is only concerned with intellectual property, it nonetheless regulates the usage of physical property. For instance, the owner of the copyright in a sculpture may prevent others from using their own materials to reproduce the sculpture. Because of its intangible character, the proprietary rights granted over the intellectual and aesthetic aspects of a work may extend to potentially any material aspect of the world. See e.g. KARLEN, P. H. (1986) Worldmaking: Property Rights in Aesthetic Creations. *The Journal of Aesthetics and Art Criticism*, 45.

⁵⁰⁴ The principle of exhaustion (or first sale doctrine in the USA) stipulates that the owner of the copy of a work is entitled to redistribute that particular copy, to the extent that it is a genuine copy which has been legitimately obtained. The doctrine is however applicable only when there is an actual transfer of ownership in the copy, accordingly, the mere licensing of a copy of the work will not give rise to the exhaustion of the right of distribution. The justification for the principle of exhaustion is copyright owners should not be entitled to control the distribution of a particular copy of the work after the first sale thereof, given that the right holders already obtained personal economic benefits from the commercial exploitation of the right of distribution on that copy. The doctrine of exhaustion may be either international, regional, or national: under the principle of international exhaustion, the exclusive right of distribution is exhausted for any given copy of the work, after that particular copy of the work has been sold anywhere in the world; under the principle of regional exhaustion, the first sale of a copy of the work into a defined geographical region will exhaust the right of distribution only within that particular region, but the right will still be enforceable in the rest of the world; whereas, under the principle of national exhaustion, the exclusive right of distribution is only exhausted within the particular country in which the first sale of that copy has been performed. See e.g. Article 6(2) of the WIPO Copyright Treaty of 1996, which provide for the exhaustion of the exclusive right of distribution, without however endorsing a particular type of exhaustion over the other. The provision has been implemented in the US through the first-sale doctrine as stipulated in section 109 of the Copyright Act. In the EU, order to

that the exclusive right of distribution should be considered exhausted after it has been exerted once, so that every copy of a work (which has been legitimately acquired) can be subsequently disseminated and redistributed to anyone without the consent of the author. However, in the digital environment, the doctrine of exhaustion does not apply for two fundamental reasons. On the one hand, the global scope of the Internet network, together with the increasing complexity of identifying national boundaries in the digital environment, have made it practically impossible to determine the geographical region in which the exclusive right of distribution has actually been exhausted.⁵⁰⁵ On the other hand, the intangible nature of digital works and the resulting volatility of their physical representation have made it increasingly difficult to determine the identity of the 'copy' for which the exclusive right of distribution has actually been exhausted.⁵⁰⁶

Identifying the constitutive elements of a work is likely to be harder in the digital environment than in the physical world, as both the physical and the digital representation of a work are more likely to change over time. In particular, the function assumed by the item_t has been drastically affected by the advent of the Internet and digital technologies.⁵⁰⁷ Despite being a good candidate to qualify as the copy of a work in the

respect the principle of free movement of goods, member States of the European Community are required to adopt at least the principle of regional exhaustion within the European Economic Area. Certain countries, such as Australia, Japan, but also Austria, Germany and the Netherlands, adopted the principle of international exhaustion. For more details, see PAPADOPOULOS, T. (2003) *The First-Sale Doctrine in International Intellectual Property Law: Trade in Copyright Related Entertainment Products. Entertainment Law*, 2, 40-60.; JEHORAM, H. C. (1996) International exhaustion versus importation right: a murky area of intellectual property law. *GRUR International*, 4.

⁵⁰⁵ The internet is a global marketplace which does not take into account any national boundaries. Differences in the national legislations with regard to the regulation of information may therefore give rise to a series of complex jurisdictional problems. See HAYES, D. L. (1998) Advanced Copyright Issues on the Internet. *Texas Intellectual Property Law Journal*, 7. In particular, with the exception of international exhaustion, the doctrine of the exhaustion of rights may be extremely difficult to enforce in the digital environment, given that it is nearly impossible to categorically determine the actual geographical location of a digital work. KURTZ, L. A. (1997) Copyright and the Internet-World without borders. *Wayne Law Review*, 43. See e.g. the preamble 29 of the European Directive 2001/29/EC which expressly stipulates that the question of exhaustion does not arise in the case of services and online services in particular.

⁵⁰⁶ Although the transfer of the digital copy of a work is in many aspect equivalent to the transfer of the physical copy of a work, the former is however technically different in that the process necessarily involves the production of a new copy of the work. While the transfer of a physical work does not therefore impinge upon the exclusive right of distribution, the transfer of a digital work, albeit legitimately acquired, would infringe both the exclusive right of reproduction and the exclusive right of distribution. Accordingly, exhaustion only applies to the material copy of a work. TARGOSZ, T. (2009) *Exhaustion in Digital Products*. Krakow, Poland, Institute of Intellectual Property Law of the Jagiellonian University. See, in particular, the WIPO Copyright Treaty, Agreed statements concerning Articles 6 and 7, which state that the expressions "copies" and "original and copies" being subject to the right of distribution refer exclusively to fixed copies that can be put into circulation as tangible objects.

⁵⁰⁷ As the physical medium has been replaced by the digital medium, the concept of the item (i.e. the physical copy) is no longer useful in the digital environment. The physicality of what is being consumed, reproduced, distributed, or otherwise exploited is in fact only incidental and for the most part irrelevant, given that what is actually being exploited does not subsist as a tangible object. While nothing prevents the copy of a digital work to be regarded as any other piece of physical property, the problem is to determine the identity and consequently the boundaries of a digital copy, an activity which is necessarily surrounded by a high level of uncertainty in view of the fact that a copy cannot be objectively identified in the digital environment. For a better overview of the various distinctions and similarities between a physical and a digital copy, see, in particular, LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership. William and Mary Law Review*, 32.

physical world, in the digital environment, the item_t has lost considerable significance as an indicator of what constitutes the copy of a digital work.

Since it is no longer possible to rely upon the physical attributes of the different instances of a work in order to determine whether or not they qualify as the same copy, it has become increasingly difficult to determine whether – and when – the different instances of a digital work can actually be considered the same. Originally intended for the physical world, the direct application of the FRBR into the digital environment may therefore give rise to a series of concerns, in particular, when it comes to the definition of what constitutes the identity of a digital copy.

THE IAO APPROACH

The Information Artifact Ontology (IAO) is a new ontology of information entities, whose purpose is to identify the basic entities that constitute an ‘information artifact’ (i.e. any piece of information that does not exist in nature but has been produced by a particular individual or machine) and to incorporate them into a formal hierarchical structure in order to define the relations that subsist amongst them.⁵⁰⁸ Compared to the FRBR framework, the IAO constitutes therefore a more comprehensive ontology, concerned with the representation of whatever entity may constitute a particular piece of information, albeit from a more generic perspective.

The architecture of the IAO fundamentally amounts to a hierarchical structure which represents a series of concepts that are somehow related to the realm of information. The structure is such that every concept that subsists at any given node of the taxonomy can be unequivocally identified through a series of attributes and relationships. Indeed, while every node may have an indefinite number of children, none of them may have more than one parent. Regardless of the potential complexity of the structure, the hierarchical relationship between the different concepts is therefore very clear. This is important because it is likely to preclude the possibility for people from different backgrounds or with different objectives to make contradictory choices concerning the representation of the very same entity.

In particular, the formal structure of the IAO is for the most part based upon the principles of the Basic Formal Ontology (BFO),⁵⁰⁹ an upper-level ontology whose structure and design are grounded in a robust realist approach.

As an upper-level ontology, the BFO is mainly concerned with providing a basis for the development of different ontologies in specialized domains and consequently tries not to interfere with them by avoiding the use of the terms that would eventually be implemented into more specific ontologies. As such, the BFO is exclusively comprised of a series of upper-level classes and concepts which are ultimately intended to represent entities in the real world, even though the BFO does not proceed to their specific analysis or description.

As a mid-level ontology, the IAO relies upon the terminology defined in the BFO in order to represent the entities at a lower level of abstraction. When it comes to defining the terms that pertain to its own domain of

⁵⁰⁸ A complete overview of the Information Artifact Ontology (IAO), including its actual structure and source code can be found at <http://code.google.com/p/information-artifact-ontology/>

⁵⁰⁹ The Basic Formal Ontology (BFO) is an upper-level ontology which basically consists of a series of sub-ontologies that can be regarded as a series of perspectives on reality. Each ontology represents some partition of reality into categories or universals. They are however only partial ontologies, i.e. they only represent that particular portion of reality which is visible through the particular perspective that each ontology focuses on. Besides, most of the entities defined in the BFO are abstract entities which may or may not accommodate concrete entities. For more details, see <http://www.ifomis.org/bfo/overview>

analysis, the IAO must therefore adopt a similar approach to the BFO in order to remain consistent with the original taxonomical framework.

The IAO has in fact been conceived as an integration framework which is actually meant to act as a bridge between the more abstract and generic concepts of the upper-level BFO and the more detailed and specific concepts of specialized domain ontologies. Indeed, because of its exclusive focus on the analysis on information artifacts, the IAO is of a considerably less abstract nature than the BFO, yet, it remains nevertheless generic enough to be potentially applied to a large variety of domains and different areas of knowledge. As such, the IAO qualifies as a mid-level ontology concerned with the description of intermediate concepts which purports to accomplish a proper formalization of any concept related to the realm of information entities and the corresponding relationships they rely upon.

Originally conceived as part of the Ontology for Biomedical Investigations (OBI),⁵¹⁰ the IAO has progressively grown into an independent ontology with its own set of rules and principles - unrestrained by the standard set of limitations imposed by the OBI, save for the more generic the rules of BFO.⁵¹¹

SECTION 1

SCOPE OF THE IAO

The IAO is ultimately concerned with the identification and description of information artifacts. As opposed to the generic terminology of the BFO which merely deals with abstract notions and generic concepts, the IAO deals with the representation of actual entities that can be identified in the real world. Knowledge representation at the domain level requires however the establishment of particular rules and principles in order to determine the way in which a particular entity is to be described and represented within a specific ontological framework. Different approaches may in fact lead to the representation of one single entity in a completely different manner, according to the perspective from which it is being looked at. In order to avoid ontological contradictions, the various entities that constitute the ontology have to be attentively described and their relationship carefully defined in a consistent and systematic way throughout the entire taxonomy.

While there can be no objective way to look at a particular entity, a realist representation is the more likely to reach a general consensus. A realist ontology is concerned exclusively with the description of things that

⁵¹⁰ The Ontology for Biomedical Investigations is a BFO-based ontology concerned with the representation of entities such as documents, measurement results, URIs, IDs, serial numbers, datatypes, databases, and ontologies, as well as the various processes in which they are created and consumed. For more details see <http://obi-ontology.org>

⁵¹¹ The Information Artifact Ontology (IAO) is a new ontology of information entities. It is a descendant of the DENRIE branch of the OBI Project, originally driven by work by the OBI digital entity and realizable information entity branch. Recently, the development of the IAO has however become an independent project separate from the OBI Project and is currently being driven by Alan Ruttenberg, Barry Smith and Werner Ceusters and several members of the OBI team. For more details on the IAO, see <http://code.google.com/p/information-artifact-ontology/>

actually exist in the real world, regardless of their physicality (i.e. whether they are tangible or not).⁵¹² Its purpose is to describe a particular domain of reality by identifying the entities that the world is made of, as well as the manner in which these entities relate to each other. Accordingly, under a realist approach, the ontological analysis for a fragment of reality must trace every entity that is being represented back to a particular thing that is observable in the physical world. While every ontology aims at identifying a conceptual structure, a realist ontology must link this conceptual structure to the world, i.e., to entities that actually exist in reality.

The advantage of a realist ontology is that it is likely to be more widely accepted. To the extent that it relates to entities that can actually be observed in the real world, the overall structure of the ontological framework can be more objectively designed and the construction thereof be more effectively moderated. Provided that it remains consistent with one particular perspective of reality, a realist ontology is therefore the most likely to obtain the general consensus of the professional and scholarly communities to which it is addressed.⁵¹³

Yet, a proper representation of reality does not necessarily need to enumerate all possibilities or all details and complications. Insofar as they do not pretend to describe the world as a whole, the assertions of the IAO are not required to be complete. The general approach of the IAO is to assume an open world, which basically assumes incomplete information by default.⁵¹⁴ In an open world framework, everything can be true unless it has been expressly established otherwise. Accordingly, if certain entities or relations have not been defined, it cannot be assumed that they do not exist in the real world. The open world assumption allows for a greater amount of flexibility and a higher level of abstraction. Every representation of reality may in fact have to deal with a certain degree of uncertainty and incomplete information. The scope of the IAO is therefore limited, but it is easily extensible and could eventually be broadened in order to better satisfy the needs of its user base.

⁵¹² A conceptual ontology is an account of a mental conception of the world. The underlying assumption is that all conceptualisations of the world are socially defined and ultimately depends upon the subjective perspective of the persons who hold them. This is in direct opposition with a realist ontology which exclusively accounts for the objective reality. The underlying belief is that there exists a reality that is composed of particular entities which are governed by natural laws and mechanisms. The purpose of a realist ontology is to represent the knowledge that we have of these entities, laws and mechanisms from a purely objective point of view. Yet, because reality can never be fully apprehended, a realist ontology should preclude from describing anything that goes beyond the extent of that objective knowledge. For more details on the different philosophical approaches that an ontology may assume, see e.g. GUBA, E. C. (1990) *The Alternative Paradigm Dialog*, Sage Publications.

⁵¹³ For instance, in the case of scientific knowledge, it can be represented (1) at the record level (i.e. according to actual data), which may lead to some inconsistencies if different records are provided by different sources; (2) at the statement level (i.e. according to what researchers say), which may lead to inconsistencies to the extent that researchers disagree with each other; or (3) at the domain level (i.e. according to what the consensus prescribe), which may however still lead to inconsistencies insofar as facts contradict each other. For more details on how to build consensus around an ontology, see e.g. RUTTENBERG, A. (2009b) *The realist approach to building ontologies for science*. Science Commons.

⁵¹⁴ The Open World Assumption (OWA) can be contrasted with the Closed World Assumption (CWA). While every assertion in the CWA framework basically contributes to asserting what is possible, in the OWA framework, instead, everything is assumed to be possible unless a particular assertion explicitly asserts the contrary. Accordingly, if a particular fact has not been contemplated in a CWA framework it can be assumed to be false, whereas the same fact should be assumed to be indefinite if it has not been mentioned in an OWA framework. See DRUMMOND, N. & SHEARER, R. (2006) *The Open World Assumption*. University of Manchester.

Yet, insofar as it relates to information, the current scope of the IAO cannot be properly established without an accurate identification of what may actually qualify as information for the purposes of the IAO. As a general rule, an information artifact can theoretically be defined as any artifact whose purpose is to allow information to be stored, retrieved, consumed, or potentially transformed.⁵¹⁵ In the context of the IAO the term assumes however a slightly different connotation. Indeed, the term ‘information artifact’ has been adopted as opposed to the alternative term ‘information entity’ in order to exclude from the scope of the IAO any given piece of information that might already exist in nature and that may hence subsist independently of any human intervention.⁵¹⁶ According to the IAO, therefore, an information artifact is a specific information entity which may essentially consist of any piece of information that has been produced by man.

As such, the quality of being an information artifact does not result from the manner in which it is perceived by the public, but rather from the manner in which it has been brought into being. The qualification of a particular entity as an information artifact is therefore a process that is likely to be more objective than a qualification based on the way in which it is being regarded by the public. After it has been produced, in fact, any information entity that may qualify as an information artifact will constantly be regarded as such, regardless of the way in which it is considered by the actual receiver of information.

Accordingly, while the receiver of information may not have a function in defining what actually constitutes information for the purposes of the IAO, the producer of information plays a crucial role. Indeed, in order for something to actually qualify as an information entity, it must originate from a sentient or a machine that was specifically designed to produce or to communicate information.⁵¹⁷

The purpose of the IAO is not only to identify what may or may not amount to an information entity, but also to represent the different ways in which information can relate to the world. Not only does the IAO purports to describe information content entities as such, but it also tries to define their relationships with the world. This is achieved by specifying where do they come from (i.e. how they have been generated), what do they consists of (i.e. what are their different parts and constitutive elements), and what do they depend upon (i.e. which other entities are necessary for them to subsist).

⁵¹⁵ It is necessary to distinguish between the conceptual information stored into an information artifact and the physical representation of that information into that particular information artifact. As an actual and physical artifact, any given information artifact can be regarded as a viewport onto a conceptual information structure. As a general rule, any artifact which has been designed to allow for information to be stored, retrieved, or transformed may therefore amount to an information artifact to the extent it is capable of conveyed that information to the public. See, for instance, GREEN, T. R. & BENYON, D. R. (1996) The skull beneath the skin: Entity-relationship modelling of Information Artefacts. *International Journal of Human-Computer Studies*, 44, 801-828.

⁵¹⁶ Originally identified as the Information Entity Ontology, the IAO has been subsequently renamed as the Information Artifact Ontology in order to narrow the focus of analysis and thereby provide a better support to the OBI, which essentially deals with information artifacts, and in order to simultaneously leave open the issue of whether DNA molecules should be regarded as actual carries of information. For more details, see the discussion on http://neurocommons.org/page/Information_Entity_Ontology

⁵¹⁷ The type of information that the IAO is interested in always originates with a sentient, which may be either (1) a particular individual that is thinking, producing and/or communicating information, or (2) a machine that has been specifically designed with the function to produce and/or to communicate a particular piece of information to the public. For more details, see the discussion on http://neurocommons.org/page/Information_Entity_Ontology

More precisely, the basic configuration of the IAO is fundamentally composed of three core categories of entities: (1) the information entities themselves, (2) the processes they are involved in, and (3) the material bearers by which they are being conveyed to the public. These three categories are ultimately linked together through a series of connections that indicate the various relationships they entertain with each other or with other kinds of entities.⁵¹⁸

Perhaps the most important category of the IAO is the information content entity (ICE),⁵¹⁹ which basically comprises anything that can be regarded as a particular piece of information that has been intentionally created by a sentient person or by a machine specifically made for that purpose. This basically covers an extremely wide range of information, including, but not limited to, any kind of document (e.g. journal articles, novels, poems, or any other kind of publication, recipes, legal documents, licenses, scientific reports, patents or patent applications, etc) or any part of a document (e.g. the abstract of a paper, the introduction or the specific sections thereof, but also the copyright section, the references, the footnotes, etc), together with any of the symbols, figures (such as any image, picture, graph, chart, diagram or table) and textual entities (including words, sentences, paragraphs, labels, URIs, etc) they are composed of. In addition, the scope of the IAO may also extend to more abstract kinds of data which are generally not subject to copyright protection (e.g. ideas, formulas, and algorithms), or a compilation of any of the above (e.g. databases).

While information entities constitute the core entities of the IAO, for the purposes of describing the realm of information artifacts, other entities necessarily have to be taken into account in order to provide a more accurate description of the world. Therefore, the IAO is also concerned with the various processes that partake in the production or consumption of a particular information entity⁵²⁰ (e.g. the writing of a novel, the recording of a speech, the transcription of an event, the encoding of a particular idea, or the communication thereof to the public), as well as with the material bearers into which these entities could potentially be incorporated⁵²¹ (e.g. books, journals, photographs, CD-ROMs, hard-drives, billboards).

Finally, in order to give meaning to the various entities it identifies and to represent them in relation to the particular portion of reality they refer to, the IAO also needs to define the various relationships that subsist

⁵¹⁸ The scope and subject matter of the IAO can fundamentally be subdivided into four categories: (1) information content entities, (2) processes that consume or produce information content entities, (3) material bearers of information, and (4) relations in which one of the relata are information content entities. See RUTTENBERG, A. (2009a) Introduction to Ontology. *ICBO: International Conference on Biomedical Ontology*. Buffalo, NY.

⁵¹⁹ The IAO class of information content entities can be browsed at http://purl.obolibrary.org/obo/IAO_0000030, where it is defined as an entity that is generically dependent on some artifact and stands in relation of aboutness to some entity. Examples of information content entities include journal articles, data, graphical layouts, and graphs.

⁵²⁰ The IAO class of processual entities can be browsed at <http://owl.cs.manchester.ac.uk/browser/classes/1823888801>, where it is defined as an occurrent that exists in time by occurring or happening, which has temporal parts and always involves and depends on some entity.

⁵²¹ The IAO class of material information bearers can be browsed at http://purl.obolibrary.org/obo/IAO_0000178, where it is defined as a material entity, such as a hard drive, upon which an information content entity generically depends.

amongst different information entities, or the relationships into which at least one information entity is involved.⁵²²

One problem that may prove particularly difficult to address, especially from the perspective of a realist ontology, is that entities in the real world may eventually evolve over time as a result of changes in their own properties or in the properties of the entities they are composed of. In particular, while spatial attributes are probably the properties that are the most commonly subject to change, over the course of time, a number of qualitative attributes are also likely to vary without necessarily affecting the identity of the entity they refer to.⁵²³ As entities assume different forms or acquire different properties, it becomes questionable whether, from an ontological standpoint, they should nevertheless be regarded as one single entity that persists over time or whether they should be considered to have evolved from one entity to another.

The answer is likely to vary according to the level of granularity at which the identity of a particular entity is ultimately being assessed. Indeed, the identity of one entity ultimately depends upon the level of details that is accounted for. While an individual may be recognized as the same entity over the course of a lifetime, in spite of the changes to its facial features and other physical attributes, if the same individual were to be considered at a molecular level, the identity thereof would be constantly subject to change.⁵²⁴

In order to resolve the concerns regarding the identity of an information entity, it is therefore necessary to account for the different levels of granularity at which the various entities that populate the ontology could potentially be assessed. The higher the level of abstraction, the higher is the likelihood that an entity will be regarded as being the same even after it has been subject to a series of alterations.

Accordingly, a proper ontological framework should always identify the different levels of granularity that could theoretically be used to refer to any given entity it defines. In particular, a clear distinction should be drawn between the most abstract levels used to represent universal concepts or types, the more generic levels

⁵²² The various relations that involve a particular information content entity are described in the IAO as properties of the particular content entity they refer to. For more details, the various properties that can be assigned to information content entities can be browsed at <http://owl.cs.manchester.ac.uk/browser/objectproperties/>

⁵²³ The persistence of an entity over time is a common ontological problem which has to be carefully addressed in order to identify the conditions under which an entity can be regarded as having the capacity to persist through time even after it has undergone an indefinite number of changes. See, for instance, GRENON, P. & SMITH, B. (2007) Persistence and Ontological Pluralism. IN KANZIAN, C. (Ed.) *Persistence*. New York, Springer.

⁵²⁴ The level of analysis is a crucial factor in determining the identity of one entity. Human beings gain and lose molecules in every second of their life. At the end of their life, most of the molecules in a human body have been replaced, and yet they are able to maintain a stable identity at the macro level because they can still be recognized as a single evolving entity. However, a human being may not be recognized as the same entity over the course of its life if it were to be considered on a micro level, such as, e.g. a molecular level. For more details, see e.g. SOWA, J. F. (1999) Ontological Categories. IN ALBERTAZZI, L. (Ed.) *Shapes of Forms: From Gestalt Psychology and Phenomenology to Ontology and Mathematics*. Kluwer Academic Publishers.

employed to individuate a particular class of entities, and the most concrete layers used to identify the specific entities that actually constitute the members of these classes (i.e. the individual instances thereof).⁵²⁵

SECTION 2

THE IAO ARCHITECTURE

As previously described, the IAO is an ontology whose overall structure has been implemented as a taxonomical structure. Its architecture is based upon a particular scheme intended to identify the various entities that constitute an information artifact and to organize them hierarchically according to the various relationships that they entertain with each other. Yet, the relationship that subsists between these different entities ultimately depends upon the particular type of entities that are being considered.

In this respect, given that the architecture of the IAO is essentially that of a mid-level ontology, it necessarily requires the support of an upper-level ontology to provide an exhaustive and comprehensive ontological framework. Accordingly, in order to describe the entities that subsist at upper levels of abstraction, the IAO ultimately relies upon the principles and general concepts of the BFO. Given that it has to adopt the same principles as the BFO and that it must implement all the entities defined therein, the architecture of the IAO is therefore a mirror of the architecture of the BFO which nonetheless features a larger number of entities in the lower levels of abstraction.

In particular, insofar as it relates to the realm of information artifacts, the core and most salient entity of the IAO is definitely the Information Content Entity (ICE), i.e. the entity that represents the actual content of information. Yet, according to the degree of granularity that is accounted for in the analysis of a particular information artifact, a variety of other entities may need to be identified at different levels of abstraction.

A. UNIVERSALS AND PARTICULARS

As a general rule, in order to represent the concepts that subsist at higher levels of abstraction, the IAO relies upon the same taxonomies of entities as the BFO. In particular, the most basic distinction introduced by the BFO is the distinction between ‘particulars’ (or tokens) which refer to concrete and tangible entities observable in the real world, and ‘universals’ (or types) which represent the common characteristics or

⁵²⁵ As opposed to a conceptual ontology, a realist ontology requires that every term correspond to an entity in reality. Iterating through the taxonomy of a realist ontology will therefore reveal a series of terms that range from the most generic terms at the top to the more specific terms at the bottom, until a particular entity that can actually be observed in the real world is finally reached at the end. Higher up in the hierarchy are universals (such as human, organ, etc) which represent general concepts that can be identified within an indefinite number of instances. Relationships amongst universal may give rise to more specific concepts which specify the taxonomic structure of the ontology (e.g. organ is_apart_of a human). At the bottom of the hierarchy are the particulars which instantiate the corresponding universals (e.g. the organ of that particular human being). See CEUSTERS, W. & SMITH, B. (2006) A Realism-Based Approach to the Evolution of Biomedical Ontologies. *American Medical Informatics Association*.

qualities that things have in common.⁵²⁶ As such, a universal is therefore a 'type' which may only exist insofar as it has been instantiated into a 'token', which is generally referred to as a particular.⁵²⁷

Universals and particulars are therefore inherently related by a relationship of instantiation.⁵²⁸ Accordingly, if 'dog' is a universal concept, any given dog that can be observed in the real world would inevitably qualify as a particular instance of the universal type 'dog'. The universal itself can therefore be said to exist in reality by virtue of the fact that it exists within its individual instances. Yet, while a universal necessarily subsists within a specific spatiotemporal context, it is a recurrent entity which can be instantiated in many different entities and may therefore exist simultaneously in different places or in different periods of time.⁵²⁹ The general rule is that universals can usually be pluralized, whereas particulars may only exist as a singular instance.⁵³⁰

As such, the main role of universals is to provide a basis for the classification of particulars.⁵³¹ However, it may sometimes be necessary to introduce an additional order of classification that does not exist in nature, so as to

⁵²⁶ In the words of Barry Smith, 'universals' are "invariants in reality", or, in other words "that in reality to which the general terms used in making scientific assertions correspond;" whereas particulars are "the instances of such universals which exist in the real world of space and time." SMITH, B. (2004) *Beyond Concepts: Ontology as Reality Representation*.

⁵²⁷ As a general rule, one subject can be attributed more than one predicate, which necessarily leads to the conclusion that both 'a is X' and 'b is X' can be regarded as true. Accordingly, although a and b constitute two distinct and separate particulars whose diversity has to be acknowledged, they nonetheless are related to the extent that they share an identical property X which constitutes a universal type. See RUSSELL, B. (1912) On the Relations of Universals and Particulars. *Proceedings of the Aristotelian Society*. Blackwell Publishing.

⁵²⁸ The relationship that subsists between universals and particulars is that of instantiation. For instance, the predicate 'x instance_of X' asserts a relation between a certain instance and a certain type or universal. Conversely, a relationship of characterization can generally be inferred from that particular relationship to the extent that it associates the inhering entities with their bearers. In order to exist, universals must have at least one entity that instantiates them. Accordingly, to be a particular is therefore equivalent to being one of the entity on which the universal is non-rigidly dependent. On the other hand, the relation of characterization is rigidly dependent upon the universal it refers to. Accordingly, the particular bearer of a universal quality could not exist without that given universal. See e.g. JANSEN, L. (2007) Dispositions, Laws, and Categories: A Critical Study of E. J. Lowe's The Four-Category Ontology. *Metaphysica*, 8.

⁵²⁹ Universals exist whenever and wherever they have been instantiated. To the extent that they can only exist if there is at least one instance thereof in the real world, however, universals are generically dependent on their instances. Accordingly, although they can exist at different places simultaneously or even at different times without existing in the intervening interval, universal nonetheless maintain a spatiotemporal existence. For more details, see NEUHAUS, F., GRENON, P. & SMITH, B. (2004) A Formal Theory of Substances, Qualities, and Universals. IN VARZI, A. & VIEU, L. (Eds.) *International Conference on Formal Ontology and Information Systems*. Turin, Italy.

⁵³⁰ As a particular instance of a universal, particulars constitute concrete and countable entities, whose identity is dependent upon their spatiotemporal continuity. Particulars fundamentally subsist as one single and distinct entity which is therefore bound to be singular (e.g. 'this dog' is an instance of the universal category of 'dogs'). Conversely, to the extent that they refer to a collection of particulars, universals or classes can instead be employed in the plural form (e.g. men, women, children, etc). For more details on the distinction between universals and particulars, see e.g. LAYCOCK, H. (1972) Some Questions of Ontology. *The Philosophical Review*, 81, 3-42.

⁵³¹ The particulars that can be observed in the real world are the bearers of certain attributes or qualities that may potentially constitute a basis for classification. Universals allow for a classification of particulars that is objective, in the sense that it is

allow for different entities to be identified according an arbitrary categorization. The notion of a class may therefore be introduced in order to regroup a series of particulars together under a common entity whose identity has been established by a series of arbitrary criteria⁵³² that designate the specific characteristics that must be shared by every particular it comprises. The advantage is that, insofar as the particular members of that class do not need to share any other properties but that of being part of the same class, the scope of a class can be defined in a completely arbitrary way.⁵³³ The function of a class is in fact to regroup terms under certain categories which reflect standard practices of the community but that cannot, as such, be regarded as universals. The core advantage is that it becomes possible to preserve the organization of the ontology as a single asserted hierarchy, while nonetheless allowing for the establishment of a poly-hierarchy whenever it is considered appropriate.⁵³⁴

theoretically independent of people judgments. Accordingly, a dog is a dog because it instantiate the universal type of a ‘dog’ and not because it is regarded as a dog by someone. Similarly, its color is black not because it appears to be black to someone, but because it instantiate the universal quality of ‘being black’. See ZALABARDO, J. L. (2001) Towards a Nominalist Empiricism. *Proceedings of the Aristotelian Society*. Blackwell Publishing.

⁵³² A defined class represent a particular collection of particulars which are regrouped together according to specific criteria which have been arbitrarily established (e.g. ‘employee of a particular bank’, ‘fans of a particular band’, etc) and could not be understood without taking into consideration the social and cultural context that pertains to the particular portion of reality that is being analyzed. For a more detailed overview of the differences between universals, classes and defined classes, see SMITH, B., KUSNIERCZYK, W., SCHOBBER, D. & CEUSTERS, W. (2006) Towards a Reference Terminology for Ontology Research and Development in the Biomedical Domain. *Proceedings of KR-MED*.

⁵³³ Classes can be defined by using a particular set of operations such as, e.g. union, intersection, complement, etc which are not available to define the boundaries of universals. Defined classes can thus be composed of a completely arbitrary set of entities which are not necessarily related to each other if not for the mere fact that they belong to the same class. For instance, the members of the class `unionOf(chocolate, dog, sun)` are not related to each other according to any universal concepts, but only according to an arbitrary classification. As opposed to universals, classes are generally defined not only on the basis of material properties and attributes, but also on the basis of conceptual properties that can only be observed in a particular cultural system. See e.g. READ, D. W. (1989) Intuitive typology and automatic classification: Divergence or full circle? *Journal of Anthroopological Archaeology*, 8, 158-188.

⁵³⁴ Under a single asserted hierarchy, there is only one root node and every node has exactly one parent, whereas under a poly-hierarchy, there are multiple root nodes and every node can have multiple parents. Given that there is usually more than one way to categorize information, a single asserted hierarchy is usually too restrictive to properly represent a particular portion of the world. For instance, a pizza is a particular that instantiate the universal type ‘pizza’. However, it is possible to classify a pizza in a variety of way. For instance, just because a pizza is a cheesy-pizza, does not mean that it cannot also qualify as another type of pizza (e.g. vegetarian-pizza). For more details, see http://obi-ontology.org/page/Defined_classes. Basically, in order to achieve a more detailed classification, an entity may need to be assigned more than one parent. The problem is that, from an ontological perspective, a poly-hierarchy is generally regarded negatively because it is much more complex to understand and to navigate. Accordingly, the BFO approach is to limit the single asserted hierarchy to universals, but to allow for poly-hierarchy at the level of classes. Accordingly, while the overall structure is that of a single subsumption hierarchy, classes are assigned to certain entities as a particular property which can be subsequently interpreted by the reasoned in order to create a specific set of poly-hierarchies. See ARANGUREN, M. E. (2005) *Ontology Design Patterns for the Formalisation of Biological Ontologies*. University of Manchester. and DRUMMOND, N. & HORRIDGE, M. (2006) *A Practical Introduction to Ontologies & OWL*. University of Manchester.

Accordingly, as a realist ontology that accommodates the principles of the BFO, the IAO recognizes the existence of universal types as patterns that exist in nature, as opposed to classes that do not exist in nature but merely consist of arbitrary groupings.

The problem is that it can be difficult to objectively distinguish between what constitutes a universal and what constitutes a class. As a general rule, the distinction is such that universals represent these patterns that can be indefinitely repeated in nature as a result of scientific laws, whereas classes represent an arbitrary categorization of entities achieved for a specific purpose. Yet, the dichotomy between classes and universals is confusing on a variety of levels. Indeed, even though universals normally refer to generic concepts, in the case of a realist ontology, they do not actually relate to abstract concept as such (such as, e.g. truth, beauty, justice, etc) but mostly to a particular kind of entities that subsist in the physical world (e.g. ‘cat’, ‘feline’, ‘mammal’, etc). Similarly, a class does not specifically refer to an individual instance as a concrete and tangible entity (e.g. the particular cat I own) but to a conceptual collection of things which belong to the same group by virtue of the fact that they all share an identical set of characteristics (e.g. a collection of particulars that may qualify as a ‘cat’ or as a ‘mammal’).⁵³⁵ Hence, the same terminology is often used to refer both to a universal and to a collection of particulars.⁵³⁶ Besides, there exist certain borderline cases which may eventually call into discussion the very basis of the distinction between classes and universals to the extent that they could be regarded both as an arbitrary categorization and as a designation of repetitive natural patterns.⁵³⁷

⁵³⁵ A class describes a particular set of particulars that shares a particular collection of features that are common to all members of the class. Basically any attribute of a given universal can be regarded as a particular quality that may be used as a basis for the definition of a class. To the extent that it includes all the attributes of a universal, a class may therefore represent the extension of that universal in the real world by regrouping together every instance thereof, although it does not as such refer to the particular instances of the universal but merely to the collection of particulars. See e.g. GUIZZARDI, G., HERRE, H. & WAGNER, G. (2002) On the General Ontological Foundations of Conceptual Modeling. BTU Institut für Informatik.

⁵³⁶ It may sometimes be difficult to distinguish between terms that designate universals or classes. In particular, in the context of collective classes (a collection of particulars fundamentally defines a particular that comprises other particulars as its members), it may even be hard to establish when a term is referring to a particular class of particulars (e.g. HIV as the sum of the different instances of the disease) or to the particular itself (e.g. HIV as an infectious retrovirus). Indeed, while distributive classes merely group together individual entities that share a particular set of identical properties (e.g. men, women, children, etc), collective classes regroup instead all individual entities that have the capacity to form a whole new entity when they are assembled together (e.g. a molecule). Confusion may therefore arise because, while the former merely represents the extension of a concept, the latter is actually the representation of a new concept *per se*. For more details on the ambiguity related to the identification of collective classes, see e.g. JOUIS, C. (2006) Hierarchical Relationships "is-a": Distinguishing Belonging, Inclusion and Part/of Relationships. *International Conference on Language Resources and Evaluation*. Genoa, Italy.

⁵³⁷ It is usually not difficult to identify what terms are to be conceived as designating universals (e.g. ‘electron’, ‘cell’, etc) or arbitrarily defined classes (e.g. ‘injured occupant of small unpowered boat’). In certain borderline cases, however, it becomes difficult to draw the line between a term that is intended to designate a universal and a term that designates a particular class or concept (e.g. ‘alcoholic non-smoker with diabetes’). Yet, as a general rule, borderline cases should not be given much value, in that they would otherwise defeat the whole purpose of the framework. Given that science is subject to constant update, a term that is considered to refer to a universal at a given time may subsequently be regarded as designating a class. For more details on the problem of classifying borderline cases, see e.g. SMITH, B., KUSNIERCZYK, W., SCHÖBER, D. & CEUSTERS, W. (2006) Towards a Reference Terminology for Ontology Research and Development in the Biomedical Domain. *Proceedings of KR-MED*.

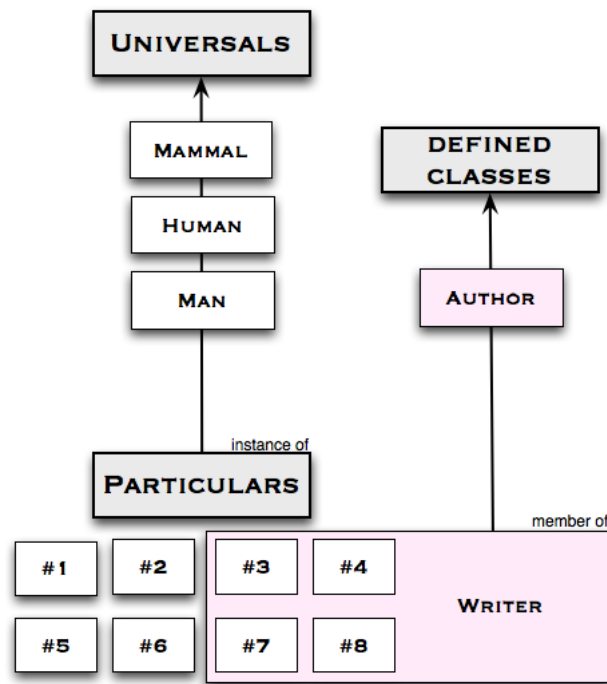
The distinction between universals, classes, and particulars is nevertheless important in order to identify various kinds of entities according to different levels of abstraction and different degrees of granularity. The universals that constitute a particular branch of the taxonomy can in fact be employed to describe the very same particular at different levels of granularity ranging from the most generic to the most specific (e.g. a Siamese cat can be defined as either an animal, a mammal, or a cat).⁵³⁸ Different entities can therefore be referred to at various levels of granularity in order to identify the different elements of their structure.

Besides, it may sometimes be convenient to establish a relationships between all entities of one type that subsist at a particular level of abstraction and all entities of another type that subsist at another level of abstraction (e.g. all domestic cats are pets). Yet, given that universals do not allow for any kind of arbitrary categorization, a class must be defined in order to regroup only those cats which can be regarded as domesticated according to social standards. Thanks to the concept of a class, it can therefore be asserted that all cats that pertain to the class 'domestic cat' are of the specific type 'pet'.⁵³⁹

In the case of Hamlet, for example, William Shakespeare is an instance of the universal type 'man', who is also a member of the defined class of 'writer' - which is itself a subset of the defined class 'author'. Because these categories have been defined by man, they cannot be regarded as 'universal' types, but only as arbitrarily defined classes. Besides, being a writer, or being an author, is not an essential characteristic of a man, but only a contingent property that might change over time. As opposed to most universals, whose instances cannot change their type over time (except in some very rare situations), members of a defined class can eventually shift from one class to another without losing their most inherent identity.

⁵³⁸ Vertically iterating through a hierarchical structure allows for the identification of the various universals which can be used to characterize a particular entity at different levels of abstraction. Every branch of the taxonomy represents a particular entity that exists in the real world and that can be categorized in a variety of categories which are more or less inclusive. Accordingly, the particular instance of a siamese can eventually be regarded as a cat, a mammal, an animal or a living being according to the level of analysis. The most basic level of categorization is the most inclusive one (i.e. the most abstract) which basically regroup a large variety of entities under the same category provided that they share identical attributes. Every entity that belongs to that category will therefore be regarded as being equivalent, although they may eventually distinguish themselves at lower levels of abstraction. See ROSCH, E. (1999) *Principles of Categorization*. IN MARGOLIS, E. & LAURENCE, S. (Eds.) *Concepts: core readings*. MIT Press.

⁵³⁹ For instance, while the biological classification of animals in vertebrates and invertebrates, and in the Linnaean taxonomy that distinguishes between mammals, reptiles, birds, fishes, amphibians, etc is universally accepted by everyone, many other animal categorizations actually exhibit certain cultural specificities to the extent that different animals may play different roles in the economic, social and religious lives of different cultures. For a broader overview of the arbitrary nature of the classification of things, see e.g. SLOMAN, S., LOMBROZO, T. & MALT, B. (2007) *Ontological commitments and domain specific categorisation*. IN ROBERTS, M. J. (Ed.) *Integrating the Mind: Domain general versus domain specific processes in higher cognition*. New York, Psychology Press.



Overall, whether an entity should be described as a universal, a class or as the particular instance of a class ultimately depends upon the prospective fields of application. Yet, as a general rule, individual instances are identified by the most specific concepts of the taxonomy. In order to establish the extent to which each layer has to be represented in the ontological framework, it is thus necessary to identify what is the lowest level of details that could possibly contribute meaningful information to the framework. Depending upon the context of analysis, therefore, a particular entity may be regarded as either a class or as the particular instance of a class.⁵⁴⁰ Indeed, while a generic ontology may qualify the concept of a “cat” as the lowest level of abstraction, a more specialized ontology may endorse a greater degree of granularity in order to be able to distinguish between e.g. a “Siamese” and an “Angora”.⁵⁴¹

Finally, every instance of a universal can be subdivided into a series of constitutive parts which represent that particular instance at finer levels of granularity (e.g. every cat possesses a particular anatomical structure which

⁵⁴⁰ The degree of granularity fundamentally determines the most specific concepts that are to be represented in the knowledge base. According to the field of application of the ontology, a different degree of granularity will therefore be selected. For example, for the purposes of a restaurant, the lowest degree of granularity may reside in the different types of wine available regardless of their physical representation, whereas it may reside in the specific tangible bottles of wine for the purpose of inventory. For a more general overview, see NOY, N. F. & MCGUINNESS, D. L. (2005) *Ontology Development: A Guide to Creating your First Ontology*. Stanford University.

⁵⁴¹ Similarly, in the context of biomedical ontologies, while on the one hand, biologists regards the various portions of tissue as the coarsest structures which they have to deal with, medical practitioners on the other hand may also be concerned with higher level of abstractions such as organs and organisms themselves. See KUMER, A., SMITH, B. & NOVOTNY, D. D. (2004) *Biomedical informatics and granularity. Comparative and Functional Genomics*, 5, 501-508.

is composed of a number of entities such as members, bones, organs, etc, which are in turn composed of a variety of cells, etc).⁵⁴²

Understanding the principle of granularity is crucial for the development of an effective ontology, because disregarding the existence of different levels of abstraction and different degrees of granularity would inevitably fail to provide a framework that could produce an accurate description of reality. In particular, granularity essentially allows for certain attributes of an entity to change without affecting the identity of that entity over time. On the one hand, it would be virtually impossible to identify one particular entity consistently over time regardless of the changes it may have been subject to. On the other hand, it would be extremely difficult to distinguish the evolution of an entity as a result of changes occurring in any of its relevant attributes, as opposed to that resulting from changes which are merely the consequence of cellular development.

Accordingly, depending upon the purposes of analysis, different levels of details should be taken into account in order to establish the identity of one particular entity and to eventually distinguish it from another.⁵⁴³

B. CONTINUANTS AND OCCURRENTS

Another important distinction established in the BFO is between the category of continuants and the category of occurrents. Continuants are entities that retain their identity and their form over time (such as, for instance, persons, books, ideas, etc) whereas occurrents are entities that do not possess a persistent identity or form and may only occur during a particular period of time (e.g. the life of a person, the writing of a book, the thinking of an idea).

While it may be argued that the distinction between continuants and occurrents is basically dependent upon the period of time that is being taken into consideration,⁵⁴⁴ the distinction goes however much further. There

⁵⁴² The anatomical structure of different biological organisms can be described at different levels of granularity. Each one of the salient units of granularity in the taxonomy are represented by the individual nodes, which are aligned in decreasing order to structural complexity (i.e. ranging from the most complex to the most simple structure), in order to provide an ontological framework that include everything from the overall anatomical entity up to the biological molecules it is composed of. For broader overview, see e.g. ROSSE, C. & MEJINO, J. L. V. (2008) The Foundational Model of Anatomy Ontology. IN BURGER, A., DAVIDSON, D. & BALDOCK, R. (Eds.) *Anatomy Ontologies for Bioinformatics: Principles and Practice*. New York, Springer.

⁵⁴³ According to the particular level of granularity that is taken into account, different criteria will be used in order to determine whether or not one entity is equivalent to another. In particular, at the atomic level, spatio-temporal continuity is a necessary condition for an entity to maintain its identity. At the static level, instead, only the non-temporal properties of a particular entity contribute to its identity. If any of them changes, the entity will however lose its identity. Conversely, at the mereological level, an entity is fundamentally extensional. Different entities can thus be regarded as being the same insofar as they are composed of identical parts. For more details, see GUARINO, N. (1999) The Role of Identity Conditions in Ontology Design. *Spatial Information Theory. Cognitive and Computational Foundations of Geographic Information Science*.

⁵⁴⁴ To some extent, the distinction between continuants and occurrents may actually depend on the time scale. For instance, while an avalanche is necessarily an occurrent, a glacier would most likely qualify as a continuant on the scale of a year, but it may be regarded as an occurrent on the scale of 10 centuries, insofar as the structure thereof may have been radically transformed and it is therefore

exists in fact a significant difference not only with regard to the fundamental nature of these two entities, but also in terms of their corresponding properties.

As their name indicates, the category of occurrents comprises a certain kind of entities which are exclusively composed of temporal parts and which may only occur within a specified period of time. Common instances of occurrents are generally described as processes, events, or as any other occurrence that is intrinsically bound in time.⁵⁴⁵ In particular, insofar as they do not possess a consistent identity that persists over time, occurrents can only be identified through their spatiotemporal dimensions. Yet, while the spatial dimension is usually ambiguous and rather difficult to determine, the temporal dimension thereof can generally be defined by virtue of the particular intervals of time through which they each unfold and endure. Indeed, one essential characteristic of occurrents is that they must necessarily have a beginning and an end. In this regard, Ingarden distinguishes between occurrents as ‘processes’ which generally subsist for an extended period of time and occurrents as ‘events’ which are practically instantaneous. Even though they ultimately all belong to the same time continuum, the two may nonetheless assume different properties and characteristics.⁵⁴⁶

As opposed to the category of occurrents, the category of continuants is composed of persistent entities with a continuous spatiotemporal subsistence.⁵⁴⁷ Devoid of any temporal parts, continuants basically consist of any entity that endures through time and that is capable of maintaining its identity over a given period time in spite of the changes it may have undertaken. Yet, while they all subsist by reason of their persistence through time, continuants can however be of very different types.

To be sure, within the BFO framework, the category of continuants has been subdivided into a series of sub-categories that basically distinguish themselves according to the manner and the extent to which different types of continuants ultimately depend upon each other.

no longer possible to recognize it as the same entity. See SOWA, J. F. (1999) *Ontological Categories*. IN ALBERTAZZI, L. (Ed.) *Shapes of Forms: From Gestalt Psychology and Phenomenology to Ontology and Mathematics*. Kluwer Academic Publishers.

⁵⁴⁵ According to Zemach, things are entities which are bound in space and continuous in time, whereas events or processes are entities which are bound in time but not in space given that they have no spatial boundaries. For more details, see ZEMACH, E. (1970) *Four Ontologies*. *Journal of Philosophy*, 67. In particular, the latter category of entities can be distinguished in two kinds: (1) entities that unfold themselves through a particular period of time, and (2) entities that constitute the temporal boundaries of the former kind of entities. See GRENON, P. & SMITH, B. (2007) *Persistence and Ontological Pluralism*. IN KANZIAN, C. (Ed.) *Persistence*. New York, Springer.

⁵⁴⁶ Ingarden distinguishes between processes which amount to particular entities that persist through time and events which are ultimately regarded as a single unit of time (in the sense that they do not have a duration) and are therefore incapable to actually persist in time. As such, events are therefore generally used to indicate the beginning or the end of a process, such as e.g. the death of a person. For more details on the distinction between events and processes from the perspective of Ingarden, see INGARDEN, R. (1964) *Time and Modes of Being*, Springfield, Illinois, Charles C. Thomas.

⁵⁴⁷ A continuant is an entity which endures through time, in the sense that none of its parts exist exclusively because of its existing at a certain time. Continuants therefore include anything that is sufficiently persistent, such as humans or other living organisms, natural objects and artifacts, but also geographical items, such as cliffs or continents, and socially-constructed entities, such as e.g. clubs, companies, or countries. See SIMONS, P. & MELIA, J. (2000) *Continuants and Occurents*. *Proceedings of the Aristotelian Society*. Blackwell Publishing.

On the one hand, independent continuants⁵⁴⁸ are concrete and material entities whose identity can be defined independently from that of any other entity. As such, they are likely to endure through time and to maintain their identity regardless of the existence of other entities. Accordingly, the category of independent continuants is fundamentally concerned with all of the organisms, objects and artifacts which are unconditionally complete and self-contained and do not therefore depend upon any third party entity for their subsistence.⁵⁴⁹ As a result, provided that an entity qualifies as an independent continuant, it will only and exclusively depend upon its own constitutive parts which necessarily qualify as independent continuants themselves. Yet, to the extent that it can still be regarded as the same entity over time, it may be possible for an independent continuant to retain its identity even after the loss or the replacement of most of its parts.⁵⁵⁰ Likewise, independent continuants are likely to exhibit a series of distinctive characteristics which may eventually change over time without however affecting the overall identity thereof. For instance, in the case of a human being, although the height and weight of an individual may assume different values through time, the individual will nonetheless be regarded as the same being, albeit with different qualities.⁵⁵¹

On the other hand, dependent continuants⁵⁵² are entities that require the existence of another continuant in order to come into being and to subsist over time. As a general rule, in fact, dependent continuants are all these entities that necessarily inhere into something else. They may refer to either abstract and conceptual entities that do not possess any kind of tangible representation on their own (such as, e.g. different patterns of signs or symbols and the specific format into which they have been encoded) or to a series of properties

⁵⁴⁸ The IAO defines an independent continuant as a continuant that is a bearer of quality and realizable entity entities, into which other entities inhere and which itself cannot inhere in anything. Examples include an organism, a heart, a leg, a person, a symphony orchestra, a chair, the bottom right portion of a human torso, the lawn and atmosphere in front of our building. For more details, see <http://www.ifomis.org/bfo/1.1/snap#IndependentContinuant>

⁵⁴⁹ Independent continuants can be of an extremely variegated nature. The types of entities that pertain to that category may in fact range from water to rocks, from particles to planets, from basic organisms to people, from atoms to molecules, etc. The distinctive feature is that they all are independent entities, in the sense that they all have the ability to exist without relying or requiring support from any other entity, although other entities may actually depend upon them. For more details, see SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science.

⁵⁵⁰ Independent continuants can preserve their identity while nevertheless undergoing a variety of changes. For instance, while soldiers may lose some of their distinctive attributes during war and certain parts of a building may end up completely destroyed, they can nonetheless be recognized as the same entity insofar as they maintain a continuous spatiotemporal dimension. See LITTLE, E. & VIZENOR, L. (2006) *Principles for the Development of Upper Ontologies*. IN BENNETT, B. & FELLBAUM, C. (Eds.) *Formal Ontology in Information Systems*.

⁵⁵¹ Independent continuants can be of very diverse nature. Yet, one of their defining characteristics is that they are such as to allow for other continuants (e.g. qualities, dispositions, functions, etc) to inhere into them. While independent continuants can be distinguished by their distinctive attributes, the actual value of these attributes may be subject to change without actually affecting the identity of the independent continuant to which they relate. For more details, see SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science.

⁵⁵² The IAO defines a dependent continuant as a continuant that is either dependent on one or other independent continuant bearers or inheres in or is borne by other entities. For more details, see <http://www.ifomis.org/bfo/1.1/snap#DependentContinuant>

inherent in a particular independent continuant, namely, the distinctive qualities thereof (e.g. its colors, shape, structure) and any other attribute that contributes to its identity, such as its corresponding functions, roles or dispositions (i.e. the so-called realizable entities). As a result of their intangible nature, however, these entities cannot actually subsist by themselves because their existence is intrinsically dependent upon the existence of a more substantial continuant.⁵⁵³

In addition, the entities that pertain in this latter category have been further distinguished as *generically dependent continuants* (GDCs)⁵⁵⁴ – e.g. the content of a book – which can be incorporated into different copies regardless of the identity thereof, and *specifically dependent continuants* (SDC)⁵⁵⁵ – e.g. the actual patterns of ink that represents the content of a book on an individual copy – which are inherently dependent upon the subsistence of that specific book as a support.

The main difference between a GDC and a SDC is that the former can inhere into more than one entity at a time and could potentially continue to exist even after the actual entity into which it has been originally incorporated has ceased to exist, but only provided that it has been incorporated into at least one other entity.

In other words, a GDC is generically dependent upon the subsistence of at least one SDC which represents a possible concretization thereof, and that particular SDC is in turn specifically dependent upon the persistence of the particular entity into which it inheres.⁵⁵⁶ Every time a GDC inheres into a new entity, a new SDC is produced as a result of the concretization of that particular GDC into a new independent continuant.

⁵⁵³ As their name indicates, the category of dependent continuants comprises all these entities whose persistence over time necessarily depends upon the subsistence of another entity. For instance, the distinctive characteristics of an entity (e.g. the qualities, roles, functions or dispositions thereof) cannot exist by themselves unless they are specifically related to a particular instance of that entity. Likewise, most immaterial entities (such as, e.g. patterns, symbols, formulas, algorithms, etc) are intrinsically dependent upon the existence of at least one material bearer that allows them to be conveyed to the world. Indeed, the defining quality of dependent continuants is that they can only exist provided that they inhere into or are borne by an actual independent continuant. See SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science.

⁵⁵⁴ The IAO defines a generically dependent continuant as a continuant that is dependent on one or other independent continuant bearers. For every instance of A requires some instance of (an independent continuant type) B but which instance of B serves can change from time to time. An example of a generically dependent continuant is a certain PDF file that exists in different and in several hard drives. For more details, see <http://www.ifomis.org/bfo/1.1/snap#GenericallyDependentContinuant>

⁵⁵⁵ The IAO defines a specifically dependent continuant as a continuant that inheres in or is borne by other entities. Every instance of A requires some specific instance of B which must always be the same. Examples of specifically dependent continuants include the mass of a cloud, the smell of mozzarella, the liquidity of blood, the color of a tomato, etc. For more details, see <http://www.ifomis.org/bfo/1.1/snap#SpecificallyDependentContinuant>

⁵⁵⁶ A SDC can fundamentally be regarded as a bridge between a particular GDC and any given independent continuant upon which it has been incorporated. Accordingly, although a GDC can potentially be instantiated into an indefinite number of entities, it may only be materialized by the means of a particular SDC that basically represents the concretization of the GDC into a particular entity upon which it specifically depends. While the SDC is specifically dependent upon the existence of the particular entity to which it refers, the GDC is thus only generically dependent upon the existence of at least one entity into which it inheres. For more details, see SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science.

An important distinction between a GDC and a SDC is connected to the notion of copyability:⁵⁵⁷ any given GDC can be indefinitely reproduced and eventually concretized into an indefinite number of SDCs without experiencing any kind of changes or deterioration. To the extent that it has been concretized into more than one SDC, even if one particular concretization of the GDC ceases to exist, the GDC will nonetheless continue to exist. Conversely, to the extent that an SDC is intrinsically connected to its bearer, it cannot be reproduced or even transferred from one entity to another (as a new and distinct SDC would rather be produced). Accordingly, whenever an independent continuant ceases to exist, it will necessarily lead to the extinction of each and every SDC that actually inheres into it.

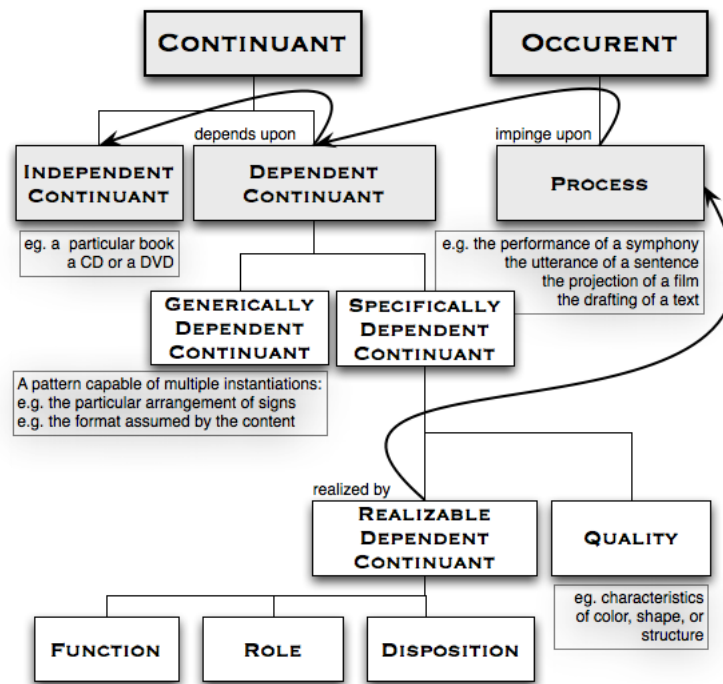
Within the general category of SDCs, entities can be further subdivided into two different subcategories. Certain entities are exclusively related to the particular qualities of a thing, i.e. the essential or distinctive characteristics thereof, whereas others are more likely to refer to the various properties that a thing may potentially assume over the course of its subsistence. The former kind of entities have been regrouped within the generic category of ‘qualities’ and have been generally employed to describe the inherent characteristics of the particular entities they refer to, such as, their corresponding color, shape, size, or weight.⁵⁵⁸ The latter class of entities have instead been identified under the more specific category of ‘realizable entities’ which fundamentally includes three different kinds of entities: (a) functions, which basically represent the different actions that can be performed by an entity and which constitute the actual purpose for which that particular entity exists and has been designed as such;⁵⁵⁹ (b) roles, which fundamentally refer to the expected patterns of behavior which have been associated with a particular entity as a result of the specific social context in which it operates;⁵⁶⁰ and (c) dispositions, which describes the natural or acquired tendency of one entity to react in a particular way to a particular event by virtue of the physical properties thereof.⁵⁶¹

⁵⁵⁷ One of the distinctive characteristics of a GDC is the notion of “copyability” which refers to the fact that even if one of its bearers ceases to exist, the GDC may nonetheless continue to survive insofar as there are other bearers. Examples of GDC are PDF files because they can be incorporated into an indefinite number of digital devices, or a particular DNA sequence because it can be incorporated into an indefinite number of chromosomes. For more detailed overview, see e.g. SMITH, B. (2009) BFO and Disease. IN TECHNOLOGIES, I. N. R. C. I. F. B. (Ed. *Signs, Symptoms and Findings: Towards an Ontology for Clinical Phenotypes*. Milan, Italy.

⁵⁵⁸ The IAO defines a quality as a specifically dependent continuant that is exhibited if it inheres in one or more entities at all (e.g. in the case of a categorical property). Qualities can be of very different kinds and natures, such as, for example: the color of a tomato, the ambient temperature of air, the circumference of a waist, the shape of a nose, the mass of a piece of gold, the weight of a chimpanzee. For more details, see <http://www.ifomis.org/bfo/1.1/snap#Quality>.

⁵⁵⁹ The function of an entity qualifies as a SDC because it is intrinsically connected to that particular entity. Under the IAO framework, a function is therefore defined as a realizable entity, the manifestation of which is an essentially end-directed activity of a continuant entity in virtue of that continuant entity being a specific kind of entity in the kind or kinds of contexts that it is made for. Examples include the function of the hearth in the body, the function of an automobile to provide transportation, the function of a judge in a court of law. For more details, see <http://www.ifomis.org/bfo/1.1/snap#Function>.

⁵⁶⁰ Within the IAO framework, a role is defined as a realizable entity, the manifestation of which brings about some result or end that is not essential to a continuant in virtue of the kind of thing that it is but that can be served or participated by that kind of continuant in some kinds of natural, social or institutional contexts. For instance, the role of the author of a document has been defined as a role inhering in a person or organization that is realized when the bearer participates in the work which is the basis of the document, in the writing of the document, and in the signing of that document with its name. Other examples include the role of a person as a surgeon, the role of a patient relative as defined by a hospital administrative form, the role of a woman as a legal mother in the



In spite of their differences, continuants and occurrents are likely to interact with each other in a variety of ways. While a series of continuants are necessarily involved in the manifestation of an occurrent, every process or event is likely to have an impact upon the realm of continuants.⁵⁶² More precisely, insofar as a particular continuant is involved into the course of an occurrent, the latter can potentially affect or impinge upon any of the properties and attributes of the former. In addition, the completion of a particular process or event may eventually result in the destruction of a particular set of continuants, or alternatively, in the creation of new ones.

Common instances of occurrents that deal with information are e.g. the performance of a symphony, the projection of a film, the drafting of a text, or even just the utterance of a sentence - all of which are processes that take a particular information entity as input and produce a particular information artifact as output. However, even if different kinds of occurrents are likely to impinge upon the same information entity, they would nonetheless result in the creation of different information artifacts. For instance, reading the scores of

context of system of laws, the role of a student in a university, etc. For a broader overview of the role of an entity defined as a realizable entity, see <http://www.ifomis.org/bfo/1.1/snap#Role>

⁵⁶¹Finally, within the IAO framework, a disposition is defined as a realizable entity that essentially causes a specific process or transformation in the object in which it inheres, under specific circumstances and in conjunction with the laws of nature. Common examples of dispositions include, for instance, the disposition of vegetables to decay when not refrigerated, the disposition of a vase to break if dropped, the disposition of blood to coagulate, the disposition of metal to conduct electricity, etc. For more details, see <http://www.ifomis.org/bfo/1.1/snap#Disposition>.

⁵⁶² In the words of Ingarden: “a process, in its essence, could not exist at all without an object enduring in time; [processes] modify the properties of enduring objects, and at times even destroy them or cause new enduring objects to come into existence, but they are not themselves a condition of their existence while they endure.” INGARDEN, R. (1964) *Time and Modes of Being*, Springfield, Illinois, Charles C. Thomas.

the 9th symphony of Beethoven will lead to a particular concretization of that symphony in the mind of the reader, yet the execution thereof by a professional artist will result in the concretization of a particular performance which will distinguish itself from any other execution of the same symphony by the same artist or by another musician.

C. INFORMATION ARTIFACTS

An information artifact should not be confused with a physical artifact. In the context of the IAO, in fact, an information artifact has been defined to include not only the information bearer as the physical medium of expression (independent continuant), but also the information carrier as the specific properties of that medium that incorporate the information (specifically dependent continuant) and the information content entity as the particular pattern that constitutes the actual body of information (generically dependent continuant).⁵⁶³

Accordingly, the content of a document, the printout of a document, or the particular patterns of ink that resides on a document all qualify as an information artifact for the purposes of the IAO, provided that they have been created as a result of an intentional process. Although the manner in which the information has been produced is not so relevant in itself, the intentionality in the process of creation constitutes in fact a crucial requirement.⁵⁶⁴ For example, unconsciously leaving a series of signs on a piece of paper does not produce an information artifact, whereas the act of deliberately writing down a sentence by producing a certain pattern of ink on the paper may ultimately lead to the production of as many as three new information artifacts: (1) the piece of paper as the information bearer, (2) the pattern of ink as the information carrier, and (3) the actual sentence as the information content. These three entities are absolutely necessary for any piece of information to be successfully communicated to the public. Indeed, although the particular pattern in the ink constitutes the entity that actually carries the information, the paper and the ink are necessary to provide a support that is capable of conveying information into the tangible world.

⁵⁶³ Although there is no official definition of what constitute an information artifact for the purposes of the IAO, the term has been loosely defined as “a dependent continuant or its bearer that is created as the result of one or more intentional processes.” Examples include: uniprot, the English language, the contents of this document or a printout of it, the temperature measurements from a weather balloon, etc. For more information, see the project home page at <http://code.google.com/p/information-artifact-ontology>

⁵⁶⁴ As opposed to an “object” which does not connote anything with regard to the way it has come into being, an “artifact” is generally understood as an object which has intentionally created by man. Artifacts are in fact created by rational agents in order to achieve one particular purpose. The intended function of a particular artifact is therefore determined at the moment of creation. Every artifact has a purpose for which it has been intentionally produced by the creator thereof, although it could eventually be subsequently used for different purposes by different categories of agents. For more details on the different dimensions of an artifact, see e.g. GARBACZ, P. (2004) *The Four Dimensions of Artifacts*. AAAI 2004. Catholic Universit of Lublin, Poland.

1. INFORMATION CONTENT ENTITY

The information content entity (ICE) represents perhaps the most significant entity for the purposes of the IAO. In order to be conveyed to the public, any given piece of information must in fact be embodied into a particular entity which communicates the information according to a particular ‘pattern’ that may subsist under a variety of forms and into a multitude of media.

Defined as an entity that is generically dependent upon some artifact and that stands in relation of ‘aboutness’ to some entity,⁵⁶⁵ the ICE is basically the pattern that constitutes the content of a particular piece of information. As a general rule, an ICE can assume different forms (e.g. it may qualify as a literary work, a musical work, a visual or artistic work). Examples of information content entities include journal articles, data, graphical layouts, graphs, and so forth. Besides, according to the level of granularity at which it is being assessed, an ICE can be subdivided into a variety of entities, such as symbols, textual entities, diagrams, images, and so on, which in turn qualify as distinct and separate ICEs.

An important requirement is that an ICE must have been intentionally produced, in the sense that it must have been created either by a sentient with the intention to produce an information artifact, or by a machine which has been intentionally designed for that purpose.⁵⁶⁶ Accordingly, the IAO takes the position that information is something that has been specifically created by man and would thus not exist in nature without human intervention.

It is often contended that whether or not a thing can be regarded as information ultimately depends upon what the receiver actually qualify as information.⁵⁶⁷ According to the IAO, however, the qualification of an entity as an ICE is intrinsically connected to the perception of the producer of that particular piece of information. Indeed, for the purposes of the IAO, the quality of something as information is ultimately defined by the intention of the originator at the moment of creation. Hence, insofar as the originator of an ICE may only consist of a person or a machine whose function is to produce and/or to communicate information, anything

⁵⁶⁵ An information content entity has been defined by the IAO as “an entity that is generically dependent on some artifact and stands in relation of aboutness to some entity”. See http://purl.obolibrary.org/obo/IAO_0000030

⁵⁶⁶ According to the IAO, information entities are necessarily intentional, in the sense that they must be produced by a sentient, intentionally, or by a machine made for that purpose. This limit the scope of the IAO to exclude any kind of information not created by man (such as e.g. information created by wind, or random patterns on a beach), even when it could actually be regarded as a method of communication (such s e.g. bee waggle dances, or ant pheromone communication). From the perspective of the IAO, therefore, communication is a broader class of processes than the actual transmission of an information entity. See RUTTENBERG, A. (2009a) Introduction to Ontology. *ICBO: International Conference on Biomedical Ontology*. Buffalo, NY.

⁵⁶⁷ Information is a term which does not have any universally accepted definition. One commonly accepted view is to regard information as a message that is transferred from one agent (the sender) to another (the receiver) in a particular language that can be properly comprehended by the receiver. Yet, to the extent that the notion of information is used to denote things that are informative, the quality of something as information is necessarily determined by the receiver. According to this view, information is therefore that a very comprehensive term, which basically include anything which amount to a sensory input and which can be extracted from a particular environment by a particular agent (e.g. by the means of observation, measurement or interpretation). For more details on the ambiguity and the various definition of the word ‘information’ see e.g. BUCKLAND, M. K. (1991b) Information as Thing. *Journal of the American Society for Information Science*, 42, 351-360.

created by a natural phenomenon may not qualify as an ICE in spite of the fact that it may actually provide information to a potential receiver.

Another distinctive characteristic is that in order to qualify as an ICE an entity has to be related to (i.e. be about) something that actually exist in the real world.⁵⁶⁸ Indeed, an ICE can only be considered informative to the extent that it is able to provide a certain kind of information concerning the things it refers to.

Under the IAO framework, reality has however been given a very general definition so as to be able to include not only tangible things that can be observed in the physical world, but also universals, general beliefs, ideas, or concepts that subsist in the mind of people. It is however arguable to what extent is it possible to stretch reality in order to accommodate a particular entity into the realm of information content entities. Indeed, any given instance of a particular work of authorship could be regarded as being about the work as a general concept, which would basically subsist by virtue of the fact that people recognize it as a separate entity in their mind. However, it is unclear from the definition of the IAO whether it is possible for an ICE to actually stand in relation of aboutness to itself or whether it necessarily has to be about another entity.

Finally, given that it can only be observed in the real world after it has been concretized into a particular medium of expression, an ICE cannot actually be said to stand on its own.⁵⁶⁹ The subsistence of an ICE necessarily relies upon the existence of at least one independent continuant that constitutes the particular medium of expression by which the information is conveyed to the public.

Under a realist approach, in fact, every entity that populates the ontology must necessarily subsist in the real world. Consequently, for any given ICE to actually qualify as an information artifact, it must first be encoded and subsequently incorporated into another entity that constitutes a particular concretization thereof. The existence of an ICE thus ultimately depends upon the instantiation thereof into a particular medium of expression in the broad sense of the term (i.e. an ICE may be instantiated into any kind of media, be it a physical or digital device, or even just and exclusively the human brain). As such, an ICE ultimately qualifies as a dependent continuant. Yet, to the extent that it can be reproduced in many perfect copies and on a variety of media, an ICE does not actually depend upon a specific medium of expression and is therefore to be regarded as a GDC as opposed to a SDC.⁵⁷⁰

⁵⁶⁸ The IAO recognizes a basic relation that relates an information artifact to a particular entity (is_about). An ICE is about another entity whenever there exists a portion of reality to which every concretization of the ICE specifically refer to, whether because it specifically or materially denotes it, or because it does at least mention one or more entities that pertain to that same portion of reality. For more details, see http://purl.obolibrary.org/obo/IAO_0000136

⁵⁶⁹ Information entities do not stand on their own. They do not amount to independent entities but are ultimately dependent upon the subsistence of (a) the entities to which they refer to them (i.e. in order to fulfill the requirement of aboutness, an ICE is intrinsically dependent upon the existence of the entities it mentions or denotes) and (b) the medium upon which they are being conveyed to the public (i.e. in order for an ICE to exist in the real world, it is necessarily dependent upon the subsistence of at least one independent continuant). For more details, see RUTTENBERG, A. (2009a) Introduction to Ontology. *ICBO: International Conference on Biomedical Ontology*. Buffalo, NY.

⁵⁷⁰ The IAO defines an information content entity (ICE) as an entity that is “generically dependent on some artifact” in the sense that every instance of an ICE requires some instance of an artifact, but that the actual identity thereof is completely irrelevant and may actually change over time. The ICE can be instantiated into a variety of different artifacts and will continue to subsist as long as there

Yet, although it can be instantiated into an indefinite number of media, the ICE does not subsist independently of the physical medium of expression. Its identity is in fact directly associated to the distinctive features of the medium into which it inheres. As such, the ICE can be regarded as a particular GDC whose identity is ultimately determined by the way in which a particular ‘pattern’ is being conveyed to the public.

To the extent that it depends upon the physical characteristics of the information bearer, the ICE can be associated to the concept of the manifestation_t (FRBR). As such, the ICE is an entity that ultimately subsists at a lower level of abstraction than what is generally understood to constitute the expression of a work, in the sense that every element that pertains to the content (e.g. the combination of signs or characters) or to the format (e.g. layout, encoding) is significant in order to determine the identity of these information entities. This was fundamentally a pragmatic decision intended to allow for the establishment of a clear and unequivocal criterion for determining equality between different ICEs. Establishing the criteria to determine when one entity is equivalent to another at the level of the expression_t (FRBR) is in fact a much more intricate task which is ultimately and necessarily subject to a certain degree of arbitrariness (e.g. whether or not the colors of a graph are inherent to the expression or to the manifestation_t ultimately depends upon whether they can be regarded as having a semantic meaning or merely a syntactic one).⁵⁷¹

2. INFORMATION CARRIER

Before it can be incorporated into a new medium, a particular instance of the ICE needs however be produced. Yet, to the extent that it qualifies as a GDC, the instantiation of an ICE into a tangible medium of expression necessarily requires the creation of a new SDC that represents the actual concretization of the ICE into that physical medium. As a general rule, in order for an ICE to actually inhere into a particular medium of expression (e.g. a given piece of paper), it has to be concretized into a particular entity (e.g. a given pattern of ink) which basically qualifies as an information carrier⁵⁷² by virtue of the fact that it actually instantiates the ICE.

As such, the instantiation of an ICE always and necessarily leads to the production of a particular carrier of information. Yet, while there could theoretically be as many ICE as there are instances of a work in the physical world, in practice, an information carrier is significantly different from an ICE. To the extent that it qualifies as a generically dependent continuant, an ICE could potentially be concretized into an indefinite number of independent continuants, whereas, given that it necessarily qualifies as a specifically dependent continuant, an information carrier may only subsist into one single information bearer.

exists at least one independent continuant that incorporates a particular instantiation thereof. For more details, see http://purl.obolibrary.org/obo/IAO_0000030

⁵⁷¹ For more details on the different reasons underlying the decision made by the IAO - that an ICE subsists at the layer of the FRBR manifestation, as opposed to the layer of the FRBR expression, see *infra* Part II. Chapter 9: The IAO Approach. Section 4: Relationship with the FRBR.

⁵⁷² An information carrier is currently defined in the IAO as the quality of an information bearer that imparts the information content, such as, for example, the pattern in ink on a page of a paperback novel. See http://purl.obolibrary.org/obo/IAO_0000125

The key function of an information carrier is to identify a series of attributes and physical characteristics which have to be assumed by a particular medium of expression in order for it to be capable of conveying the relevant information to the public. As a result of assuming that particular set of qualities, the medium - as an independent continuant - may end up with a completely different set of properties. While, on the one hand, certain of the qualities that already pertain to the entities involved in the process may be subject to a certain number of amendments, on the other hand, new and additional qualities may also be introduced into their corresponding set of properties. For instance, any piece of paper that incorporates some piece of information can basically be regarded as having been marked with a particular pattern of ink which is specifically intended to denote that information. Similarly, as soon as a digital file is saved into the physical memory of a computer, the magnetic pattern of the hard disk has to be modified in order to assume a property that basically denotes the information contained into the digital file. Likewise, whenever an individual is consuming a particular piece of information, an actual mark is created into the memory section of the brain which specifically denotes the content of that information.

These qualities are what actually constitute the information carrier. Insofar as it describes the way in which a particular ICE has to be materialized into the real world, the information carrier can fundamentally be regarded as that particular quality of an information bearer that ultimately imparts the information content. As such, the information carrier assumes therefore the important function of turning any independent continuant into which an ICE has been incorporated into an actual bearer of information.

3. INFORMATION BEARER

As a result of its immaterial nature, information is fundamentally and inherently intangible. Before it can be conveyed to the public, information must therefore be turned into an ICE and at least one instance thereof must be produced and turned into an information carrier. Yet, given their intangible nature, neither the ICE into which a particular piece of information has been articulated, nor the corresponding information carrier into which it has been concretized can however be experienced in the real world unless they have been incorporated into a tangible medium of expression.

If the ICE constitutes the actual content of information, the information bearer is that physical object into which the content is encoded. Any physical entity could therefore qualify as an information bearer to the extent that it constitutes the concretization of a particular piece of content into the real world. Accordingly, an information bearer fundamentally consists of any material entity (e.g. a book, a photograph, a CD, a hard drive) upon which an ICE generically depends.⁵⁷³ Assuming that a particular piece of information has been successfully turned into an ICE and that a particular instance of that ICE has been effectively embodied into an information carrier, the incorporation of that information carrier into a physical entity will consequently lead to the creation of an information bearer.

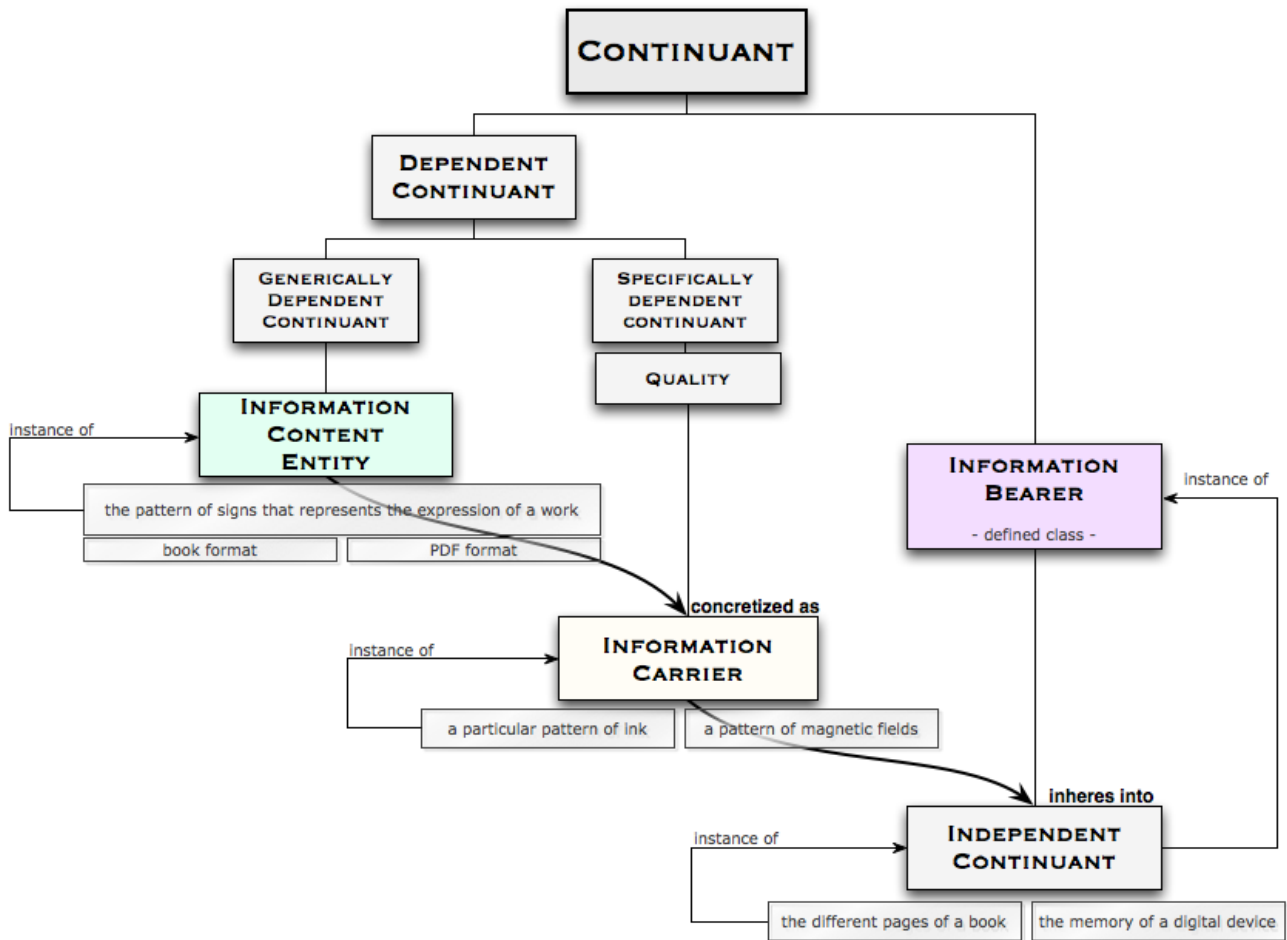
⁵⁷³ An information bearer is currently defined in the IAO as a material entity, such as a hard drive, upon which an information content entity generically depends. See http://purl.obolibrary.org/obo/IAO_0000120

In other words, whenever an ICE (e.g. a particular pattern of ink) is incorporated into a physical medium of expression (e.g. a particular piece of paper) according to the specific configuration described by that information carrier which actually instantiates the ICE (e.g. as a result of the incorporation of that particular pattern of ink into that particular piece of paper), the medium will consequently qualify as an information artifact.

One important requirement is however that the quality of being an information bearer has been acquired as a result of a deliberate act intended to produce an information artifact.⁵⁷⁴ The quality of being an information bearer does not therefore depend upon the distinctive characteristics of any given medium of expression but is for the most part related to the specific properties and contingent attributes thereof. Regardless of its nature or type, any medium of expression could eventually assume the quality of an information bearer by virtue of the mere fact that it incorporates a particular type of ICE. Conversely, any medium which currently qualifies as an information bearer could eventually be deprived of this quality to the extent that it no longer exhibits that particular set of attributes identified by the information carrier (e.g. a book whose pages have been burnt, a defective CD-ROM).

As the only one of the information artifacts that subsists in the physical world, the information bearer is the only entity that actually qualifies as a particular (i.e. as a token, as opposed to a type). As such, according to the number of details which are taken into account, the information bearer can be described at different levels of abstraction. For instance, in the case of a 'book', different instances may distinguish themselves according to whether they amount to a 'paper-back' or 'hard-cover' edition. Similarly, in the case of a sound recording, it can be incorporated into a generic medium such as an 'audio tape' or a 'hard drive', although different instances of an audio tape are likely to differ according to their type and different instances of a hard drive can distinguish themselves according to their corresponding capacity and speed.

⁵⁷⁴ An independent continuant can be regarded as an information bearer only to the extent that it actually amounts to the bearer of one or more ICEs. Yet, an information entity may only qualify as an ICE insofar as it has been intentionally produced to convey information about certain entities that subsist in the real world. Similarly, an independent continuant may only qualify as an information bearer insofar as it has been deliberately turned into a bearer of that ICE. As opposed to other independent continuants which do not refer to anything else (i.e. non-referring particulars), information bearers necessarily refer to some entity in the real world, be it either a non-referring particular (e.g. the hospital badge of a doctor that refers to its status in that hospital) or another information bearer (e.g. the document that bears a textual description of that badge). See e.g. CEUSTERS, W., CAPOLUPO, M. & DEVLIES, J. (2009) ReMINE - RAPS Application ontology.



SECTION 3

EMPIRICAL APPLICATION

Having investigated the overall structure of the IAO and having identified the distinctive characteristics which belong to the different entities that constitute an information artifact, the framework of the IAO can now be employed to perform the ontological analysis of any given work of authorship.

| | | | |
|--------------------------------|--|---|--|
| IAO | SHAKESPEARE'S HAMLET | DA VINCI'S MONA LISA | BEETHOVEN'S FUR ELISE |
| UNIVERSAL TYPE | Any 'work of authorship' that has been articulated under the form of either a: <div> <div>'literary work'</div> <div>'artistic work'</div> <div>'musical work'</div> </div> | | |
| PARTICULAR | The particular instance of any given work of authorship into any tangible medium. | | |
| OCCURRENT | The drafting of Hamlet by William Shakespeare, or the reading of Hamlet by a particular individual. | The painting of the Mona Lisa by Leonardo da Vinci, or a reproduction thereof by another artist. | The composing of the melody by Beethoven, or the performance thereof by a particular orchestra. |
| CONTINUANT | Any entity (tangible or intangible) that subsists in reality and persists over time: | | |
| INFORMATION CONTENT | The specific arrangement of words that conveys the story of Hamlet, as they have been formatted into a published edition. | The specific set of brush strokes that constitute the oil painting, as they have been applied to a particular kind of canvas. | The specific arrangement of notes that constitutes the melody, as they have been recorded into a medium of expression. |
| INFORMATION CARRIER | The specific pattern of ink that reproduces that particular arrangement of words into a tangible medium (e.g. this piece of paper, i.e. the information bearer). | The actual paint that subsists on the surface of that particular canvas on which the Mona Lisa has been painted. | The pattern that has been incorporated into a tangible medium and that represents the basis for a given device to produce a particular set of sound waves. |
| INFORMATION BEARER | The physical medium that incorporates the paper on which the literary content has been incorporated (e.g. the copy of a book). | That particular canvas over which the particular mixture of oil paint that represents the Mona Lisa has been applied. | The physical medium that incorporates that particular pattern that represents the melody (e.g. a magnetic tape). |

| | |
|----------------------------|---|
| IAO | WIKIPEDIA WEBSITE |
| UNIVERSAL TYPE | ‘Work of authorship’ that has been articulated in the form of an ‘Internet website’ |
| PARTICULAR | The various instances of Wikipedia’s website in the memory of any digital device. |
| OCCURRENT | The making of the website, the access thereof, the addition of new entries by users |
| CONTINUANT: | |
| INFORMATION CONTENT | The actual content that constitutes Wikipedia’s website at a specific point in time, formatted according to particular characteristics of layout and style (html, css, etc) and encoded into a specific sequence of bits that constitute the website’s digital file |
| INFORMATION CARRIER | The magnetic pattern that represents that file into the memory of a digital device. |
| INFORMATION BEARER | The physical device whose memory has been marked with that magnetic pattern. |

To continue with the former example, it now is possible to adopt the IAO approach in order to perform the ontological analysis of Hamlet by Shakespeare.

Different kinds of entities could theoretically be employed to represent the same entity at different levels of abstraction and at different degrees of granularity. At the highest level of abstraction, there is the general category of the ‘work’, which fundamentally includes anything that constitutes the result of human labor in the broadest sense of the term (i.e. artifacts). A ‘work of authorship’ is a more specific category which only comprises artifacts that have been made by an author in the normal scope of duties (i.e. works that require at least some extent of creativity).⁵⁷⁵ The works in this latter category further distinguish themselves into a series

⁵⁷⁵ It is difficult to provide an exact definition of what constitutes an actual work of authorship. The definition is in fact likely to vary according to the context of analysis. For instance, a work of authorship can be defined according to (a) an objective analysis, in the sense that any stroke of work, no matter how it was created or by whom, can qualify as a work of authorship to the extent that it has been intentionally produced by a conscious agent and that it displays at least some minimum level of creativity, (b) the intention of the author, according to which a particular stroke of work may only qualify as a work of authorship in so far as the author actually intended it to be such, or (c) an aesthetic test which determines whether a work can ultimately qualify as a work of authorship according what society considers to qualify as a piece of art. In the context of copyright law, the objective analysis is perhaps the most predominant test, although judges may sometimes rely on the latter two in order to determine whether a work is actually eligible for protection. For a more detailed overview of what constitutes a work of authorship for the purposes of copyright law, see e.g. PRICE, M. E. & POLLACK, M. (1991) The Author in Copyright: Notes for the literary critic. *Cardozo Arts & Entertainment Law Journal*, 10.

of subcategories according to the fundamental nature thereof (i.e. ‘literary works’, ‘musical works’, ‘visual works’, etc). Finally, most of these works can generally be classified into a variety of more specific categories according to their nature or type. For instance, artistic works may be of many different types, such as ‘paintings’, ‘drawings’, ‘photographs’, etc, whereas literary works generally distinguish themselves according to their genre, such as ‘articles’, ‘reports’, ‘poems’, ‘novels’, etc.

Hamlet can be regarded as the particular instance of a ‘work’ which – being it the result of the creative endeavor of a British author (William Shakespeare) – necessarily qualifies as an original ‘work of authorship’. As such, Hamlet could potentially be articulated into a variety of ways, e.g. under the form of a literary work (defined by the particular combination of words and their corresponding arrangement into a narrative work), a dramatic work (defined by the specific content of the script and the corresponding scenario it implements), an audiovisual work, and so forth.⁵⁷⁶ Yet, for practical reasons, the current analysis will exclusively focus on the work of Hamlet implemented as a ‘literary work’ under the format of a ‘novel’ or a ‘play’.

To begin with, the drafting of Hamlet’s original manuscript by Shakespeare can be regarded as an occurrent that takes a series of independent continuants as an input, in order to produce a series of information artifacts as an output: (1) the content of the manuscript as an information entity, (2) the actual pattern of ink as the information carrier, and (3) the manuscript as the actual bearer of information.

As an information entity, the work of Hamlet can be described as a particular pattern that represents (a) the literary content of the work and (b) the format in which it is conveyed to the public. As such, the identity of the ICE is ultimately determined by the distinctive characteristics of its content and the corresponding format thereof.⁵⁷⁷ For instance, as the particular instance of a ‘play’, the information content is likely to distinguish itself from any other ICE which, for example, articulates Hamlet in the form of a novel. A ‘play’ is in fact composed of a series of acts, which can in turn be subdivided into a multitude of scenes which display different properties and attributes. From a deeper level of analysis, it can also be observed that every act and every scene that constitute the Hamlet is ultimately composed of a variety of smaller parts (such as, sections, paragraphs,

⁵⁷⁶ A work of authorship is a generic entity that ultimately refers to the actual content of the work, as opposed to the form into which it has been expressed. A particular work may therefore appear in different form and nonetheless be regarded as the same work of authorship. Any given work that express an identical concept or that exhibits a similar content or structure is therefore likely to qualify as the same work of authorship, regardless of the form it may assume (i.e. be it either a literary, dramatic, musical or artistic work). See YEE, M. M. (1995) What is a Work? Cataloging Theorists and a Definition. *Cataloging & Classification Quarterly*, 20, 3-23.

⁵⁷⁷ Because a particular ICE can inhere into an indefinite number of entities, it is not possible to rely on physical identity in order to determine whether different entities are associated to the same ICE. It becomes therefore necessary to establish a series of identity conditions that must be fulfilled for separate entities to be regarded as an instance of the same ICE. As a general rule, in order for an entity to qualify as a particular instance of an ICE, it must display a particular set of properties that is shared in common with every other instance of the ICE. Accordingly, this particular set of properties can be employed as an identity criterion to determine whether or not one entity actually constitutes an instance of that particular ICE. For a more detailed analysis of the role of identity conditions in determining the identity of an entity, see e.g. COLLIER, J. (2004) Self-organisation, Individuation and Identity. *Revue Internationale de Philosophie*, 151-172.

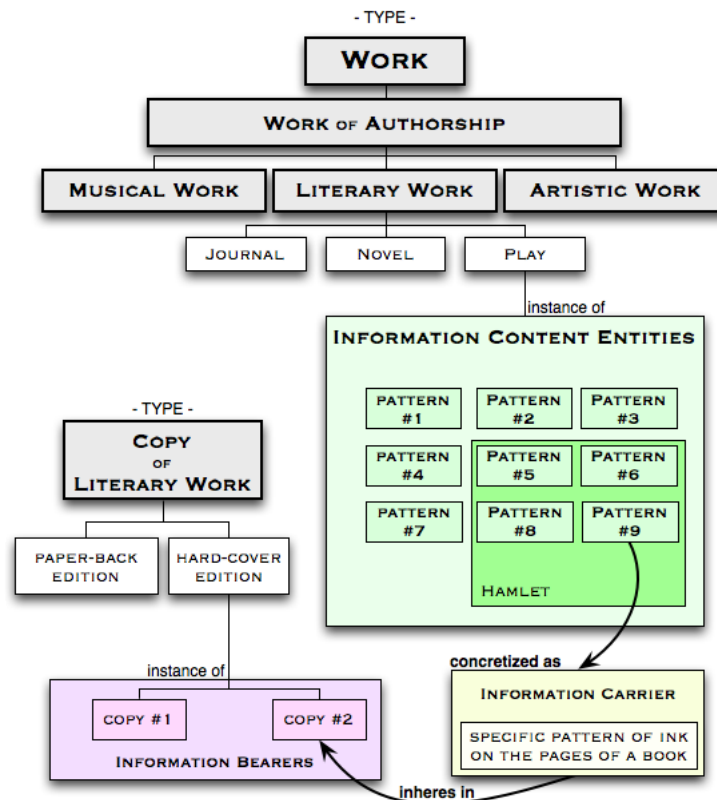
sentences, words, etc) which qualify as distinct and separate entities that may in turn distinguish themselves according to their distinctive characteristics.⁵⁷⁸

Even though it has initially been instantiated into the original manuscript drafted by William Shakespeare, the actual pattern of the ICE can theoretically be extracted and subsequently reproduced into an indefinite number of media. As a general rule, therefore, Hamlet as a literary work could inhere into a variety of media (such as, e.g. a book, an audio tape, a digital device, or a brain). Yet, in order for a physical medium to be regarded as an information artifact, it must necessarily qualify as an information bearer which is capable of carrying and conveying an information entity to the public.⁵⁷⁹

As a consequence of recording the work of Hamlet into a physical medium (e.g. as a result of printing it on the pages of a book, saving it on a digital device, or recording it into the brain of someone), the latter will assume a series of distinctive characteristics that will become specific to that medium (e.g. the specific pattern of ink on the pages of the book, the magnetic pattern in the memory of the computer, or the neural pattern in the brain of a particular individual). This particular set of characteristics can be defined as a new entity (the information carrier) which provides a description of the manner in which the work has been embodied into a particular medium of expression (e.g. the typographical arrangement that characterizes the pages of the book, the specific sequence of bits that defines the identity of a digital file, or the particular neural pattern that subsists in the brain of an individual). In particular, with regard to Hamlet's original manuscript, the information carrier is defined by that particular pattern of ink that inheres into the pages of the manuscript - which can henceforth be regarded as an information bearer. Insofar as it represents a particular concretization of Hamlet into a physical medium of expression, the information carrier is however specifically dependent upon the subsistence of the medium it refers to and would therefore cease to exist as soon as the manuscript would perish.

⁵⁷⁸ According to the IAO, a textual entity is a generically dependent continuant whose concretizations are patterns of glyphs intended to be interpreted as words, formulas, etc. Common examples of a textual entity include e.g. words, sentences, paragraphs, or any of the written parts of a publication. Given that a textual entity is considered to be part of a manifestation (in the FRBR sense), every property and attribute thereof actually contribute to defining its identity whether they refer to the semantics or to the format thereof. In other words, everything is significant: characters, white spaces, line breaks, but also the format thereof (for instance, the PDF and the HTML version of the same document necessarily constitute two separate textual entities). For a more detailed overview of the textual entity according to the IAO, see http://purl.obolibrary.org/obo/IAO_0000300

⁵⁷⁹ Any given ICE can be concretized in the real world as some physical quality that is assumed by a particular medium of expression. For instance, regardless of its type, a particular ICE can theoretically be concretized into any given independent continuant to the extent that it is able to assume that particular set of qualities which properly represents all the distinctive characteristics of that ICE. In other words, whenever an ICE inheres into a specific medium of expression, the latter automatically becomes the bearer of the concretized qualities of that particular ICE. For a more comprehensive overview, see <http://code.google.com/p/information-artifact-ontology/>



As can be seen from the above illustration, in spite of Hamlet being an original ‘work of authorship’ that may qualify a ‘literary work’ in the format of a ‘novel’ or a ‘play’, it does not however relate to these classes through a relationship of subsumption (is_a), but only through a relationship of instantiation (instance_of). Indeed, if a class has been defined by a particular set of properties, it must fundamentally include each and every entity that instantiates these properties.⁵⁸⁰ Hence, to the extent that it can be defined as a literary work, a ‘novel’ is necessarily a subclass of a ‘literary work’ (i.e. the property of being a literary work is a rigid property of a novel). Hamlet, however, cannot be regarded as the subclass of a ‘novel’ because it does not necessarily have to belong to that category (i.e. the property of being a novel is not a rigid property of Hamlet). From an ontological perspective, therefore, the literary work of Hamlet may not qualify either as a ‘work’ or as a ‘literary work’, but only as a particular instance of a ‘novel’ or a ‘play’.

In addition, Hamlet as the instance of a ‘novel’ could itself be instantiated into a series of different ICE’s. It does, as such, qualify as a ‘particular’, but rather as a particular class or ‘type’ that specifies the distinctive

⁵⁸⁰ The design of the taxonomic structure of an ontology is necessarily subject to a series of constraints. In particular, given that every entity in the ontology must instantiate at least one property of the taxonomy, the ontology should be designed in such a way as to create a hierarchical structure which displays all the rigid properties that belongs to these entities organized according to a relationship of subsumption. One of the main problems to be addressed when developing an ontology is therefore that of deciding whether or not one property should subsume another. As a general rule, a class can be considered to subsume another class whenever all the instances of the subclass are necessarily instances of the superclass. For instance, given that ‘human’ is a subclass of ‘mammal’, if Alex is a human, Alex must necessarily be a mammal. See e.g. GUARINO, N. & WELTY, C. (2002) Evaluating ontological Decisions with Ontoclean. *Communications of the ACM*, 45.

qualities and properties that any ICE has to assume in order to be regarded as a particular concretization of the work.⁵⁸¹ Any ICE whose pattern satisfies these conditions will therefore qualify as an instance of the class ‘Hamlet’ and every ICE that incorporates the same pattern will necessarily qualify as a member of the same class. This point will be addressed in more details in the following section.⁵⁸²

SECTION 4

RELATIONSHIP WITH THE FRBR

The FRBR and the IAO are two ontological frameworks that distinguish themselves in a large number of respects. Indeed, given that they have been conceived in order to achieve a completely different set of objectives, the two are nowadays employed in different fields of application. While the FRBR is exclusively concerned with the identification and the categorization of bibliographic records, the IAO has so far only been used to identify the various information artifacts which are relevant in the context of biomedical investigations.

Because of the generality of their taxonomies, both frameworks could, however, be applied by analogy to different sectors of activity which are somehow connected with the realm of information goods. For the purpose of this research, therefore, an attempt will be made to establish how these two frameworks could theoretically be applied to the realm of copyright law, and, most importantly, whether they would actually be suitable to describe the various entities that constitute a particular work of authorship, either in the physical or in the digital environment.

Yet, before investigating how the IAO and the FRBR framework respectively interact with the provisions of copyright law, an analysis of how the two ontological frameworks actually interrelate with each other may be valuable for the purposes of comparison. In spite of their structural and conceptual divergences, it is possible to individuate a particular correlation between the various entities identified within the FRBR and the IAO.

⁵⁸¹ To the extent that it is a type (as opposed to a token), a literary work should be not regarded as a particular, but rather a class, i.e. as a particular collection of entities that comprise every instantiation of the work, in any manner or form, into a particular medium of expression. Indeed, any given work could potentially be incorporated into a variety of media of different nature and with different characteristics. Even though the instantiation of a particular work of authorship into a particular medium of expression necessarily leads to the latter adopting a set of physical properties that reflect the aesthetic of the work, it is therefore not possible to describe the work itself according to a set of physical characteristics, if not by referring to the attributes of the actual bearer of information as opposed to that of the work itself. See e.g. BACHRACH, J. E. (1971) Type and Token and the Identification of the Work of Art. *Philosophy and Phenomenological Research*, 31, 415-420.

⁵⁸² For more details on how, even though it does not incorporate it by default into its own taxonomy, the concept of a work as a class can be implemented within the IAO framework under the form of a defined class, see *infra* Part II. Chapter 9. IAO approach. Section 4: Relationship with the FRBR.

A. ITEM - INFORMATION BEARER

The most evident is perhaps the correlation that subsists between the definition given by the FRBR framework to the *item_t* and the concept of an information bearer as it has been defined within the context of the IAO. To the extent that it relates to a physical entity that incorporates the particular instance of a work, the *item_t* can ultimately be associated to an information bearer, or, in other words, to an independent continuant that incorporates a particular ICE by virtue of the fact that it displays all the characteristics described by an information carrier.

Insofar as they both refer to the same physical entity, there is basically no difference between what constitutes an *item_t* according to the FRBR and what has instead been defined as an information bearer within the IAO. Under the FRBR framework, the only requirement for any physical entity to qualify as an *item_t* is that it incorporates a particular *manifestation_t* of the work, whereas, under the IAO, the only requirement for any independent continuant to qualify as an information bearer is that it incorporates an information carrier that represents a particular ICE.

B. MANIFESTATION - INFORMATION CONTENT ENTITY

Before proceeding towards the analysis of the other layers of abstraction, an important issue is to determine whether the ICE as it has been defined by the IAO was intended to subsist at the level of the *expression_t* or the *manifestation_t*.

The FRBR distinguishes between the *expression_t* and the *manifestation_t* according to the role assumed by a particular entity. Anything that is semantically relevant (i.e. that contributes to the meaning of a work) is considered to pertain to the *expression_t*, whereas anything that is a mere matter of presentation (i.e. that is unlikely to affect the meaning of the work) necessarily belongs to the *manifestation_t*.⁵⁸³

Even though an ICE has been defined as a GDC within the framework of the IAO, no indication has been given on whether it does, in fact, refer to the *expression_t* or the *manifestation_t* of a work in the FRBR sense.

⁵⁸³ The FRBR distinguishes between the Expression and the Manifestation of a work according to whether a particular characteristic is semantically relevant (in the sense that it pertains to the content of the work) or structurally relevant (in the sense that it contributes to the form of the work). Accordingly, every attribute that actually constitutes the content of the work is regarded as part of the Expression, whereas any formal attribute that does not pertain to the content is regarded as part of the Manifestation. For more details on the distinction between the Expression and the Manifestation of a work in the FRBR framework, see CARLYLE, A. (2007) Understanding FRBR as a Conceptual Model: FRBR and the Bibliographic Universe. *Bulletin of the American Society for Information Science and Technology*, September 2007.

Yet, certain of the entities that belong to that class, such as the textual entity,⁵⁸⁴ have been explicitly defined to subsist at the level of the FRBR manifestation_t. As the identity of any textual entity can only be defined after a particular pattern of signs has been embodied into a particular document, the identity thereof is basically determined both by the type of document into which it inheres and by the way in which it has been presented in that document. Hence, to the extent that it represents a pattern that describes a particular set of signs which has been formatted in such a way as to be encoded into a specific medium of expression, every textual entity could basically be regarded as the particular manifestation_t of a literary work in the FRBR sense.

As such, it would come natural to presume that, given that the subclasses of the ICE have been defined to subsist at the level of the manifestation_t, the ICE should itself be considered to subsist at the same layer of abstraction. Indeed, as opposed to the information carrier, which is specific to the physical item_t to which it inherently belongs, the ICE qualifies instead as a GDC that could potentially inhere into an indefinite number of information carriers.

In other words, the ICE is an entity which results from the concretization of a work into a particular medium of expression and which basically represents the content of that work after it has been encoded into a format that can be easily incorporated into that particular medium of expression.

Hence, even though every element that pertains either to the content or to the format of the work is to be taken into account in order to determine the character of an ICE,⁵⁸⁵ the identity of an ICE remains independent from the actual information bearer into which it has been incorporated. Through the production of a new information carrier, a new instance of the same ICE could in fact subsequently be incorporated into any other information bearer of the same kind. As such, the ICE is therefore an entity that subsists at the same level of abstraction as the manifestation_t in the context of the IAO.

The main advantage for an ICE to be defined at the level of the FRBR manifestation_t is that it makes it easier to determine equality between the different instances thereof. Indeed, establishing identity between different manifestations_t of the same expression_t is often a difficult process which can hardly be performed by a machine, insofar as it is likely to require at least a minimum amount of subjective judgment. Sometimes, whether a particular characteristic is to be regarded as an attribute of the expression or of the manifestation is in fact to be determined according to the context into which it is being assessed.

⁵⁸⁴ The IAO defines the textual entity as a subclass of the information content entity which represents a part of a manifestation (FRBR sense), a generically dependent continuant whose concretizations are patterns of glyphs intended to be interpreted as words, formulas, etc. Given that they subsist at the FRBR manifestation level, everything contributes to determine the identity thereof (e.g. layout, line breaks), and the different versions of a same document also constitute different textual entities (e.g. PDF versus HTML). For more details, see http://purl.obolibrary.org/obo/IAO_0000300

⁵⁸⁵ According to Larry Hunter, one of the contributors to the IAO, the fact that an ICE has been decided to subsist at the FRBR manifestation level was fundamentally a pragmatic decision so that there could be a clear criterion for determining equality amongst of textual entities. The decision was thus grounded on the fact that is usually too hard to determine in the general case when two FRBR expressions are the same (e.g. the HTML and the PDF versions of a particular document might often contain different information). The IAO does not however preclude the possibility of introducing new terms that would live at the FRBR expression into the IAO if there is clearly a need for such a new terminology, and if their identity could be clearly defined. For more details, see the IAO mailing list discussion available at <http://groups.google.com/group/information-ontology>

For instance, although the meaning of any given piece of information is generally determined by the actual content thereof, it is often the case that the specific formatting and/or layout of one or more parts of the document are intended to either convey additional information or to at least modify the meaning of the content.⁵⁸⁶ As a general rule, therefore, while a particular attribute of style may be regarded as part of the manifestation_t in one context, it may nonetheless qualify as part of the expression_t in a different context of analysis. Allowing for the ICE to subsist at the level of the manifestation_t is likely to resolve this problem by removing the need to distinguish between one ICE and the other according to whether or not they differ at the level of the FRBR expression_t.

The main disadvantage of this approach is that it precludes the possibility of regrouping every entity that communicates a particular piece of content together under a common framework, regardless of the way in which the content is conveyed to the public. This is the function performed by the expression_t within the FRBR framework.⁵⁸⁷ The problem, however, is that, while it is usually relatively easy to establish equality amongst the different instances of a manifestation_t, the conditions that must be fulfilled in order to establish equality amongst the various instances of an expression_t are much more difficult to identify.

Accordingly, if the ICE were actually considered to subsist at the level of the expression_t, it would be very complicate for a machine to determine whether or not different entities actually incorporate the same ICE. From the perspective of a computer, in fact, it would be problematic to determine equality at any other level of abstraction than that of the digital file - which basically constitutes the manifestation_t of a digital work. This is perhaps the reason why the IAO has ultimately been leaning towards requiring the ICE (and the various subclasses thereof) to actually be defined at the level of the FRBR manifestation_t.⁵⁸⁸

⁵⁸⁶ For instance, in the biomedical field, the italicization of the name of a gene is intended to express the fact that the word actually refers to a particular species or gene, as opposed to a particular gene product. See e.g. <http://www.genenames.org/guidelines.html> In this context, therefore, the quality of being *italic* is semantically significant and should therefore be regarded as a characteristic of the expression, even though the italicization of a word which may only be justified on the basis of styling should instead be regarded as part of the manifestation.

⁵⁸⁷ One advantage of the fact that a textual entity subsists at the level of the manifestation (in the FRBR sense) is that it allows to unequivocally determining whether or not an instance is equivalent to another. However, such a definition also entails a number of disadvantages. For instance, different documents may incorporate an entity which conveys an identical expression (e.g. the name of an author). While every one of these documents necessarily incorporates an individual instance of a particular textual entity, the various instances will not be regarded as a concretization of the same textual entity to the extent that they differ in their manifestation (i.e. if they have been incorporated into a different kind of document, or e.g. if they have been formatted with a different typo).

⁵⁸⁸ According to Larry Hunter, one of the contributors to the IAO, the fact that a textual entity has been decided to live at the FRBR manifestation level was fundamentally a pragmatic decision so that there could be a clear criterion for determining equality amongst of textual entities. The decision was thus grounded on the fact that is generally too hard to determine in the general case when two FRBR expressions are the same (e.g. the HTML and the PDF versions of a particular document might often contain different information). The IAO does not however preclude the possibility of introducing new terms that would live at the FRBR expression into the IAO if there is clearly a need for such a new terminology, and if their identity could be clearly defined. For more details, see the IAO mailing list discussion available at <http://groups.google.com/group/information-ontology>

C. EXPRESSION — GENERICALLY DEPENDENT CONTINUANT

Although the structure of the FRBR and that of the IAO display a certain number of similarities, their individual configuration is such that it is not always possible to establish a direct and unequivocal correlation between the various entities that subsist within these two ontological frameworks. Indeed, because of their different approaches, some of the entities which are considered essential in one particular framework have not necessarily been implemented in the other.

For instance, the *expression_t* as it has been defined by the FRBR does not enjoy any evident counterpart in the context of the IAO. As opposed to the FRBR framework, in fact, the IAO is mainly concerned with the various *manifestations_t* that can be identified through an ICE. As such, it does not explicitly recognize any entity that subsists at any higher level of abstraction.

Yet, to the extent that it consists of a recognizable pattern of signs or symbols that represent a particular articulation of the work, the FRBR *expression_t* could be regarded as a particular GDC which can be encoded into a variety of ICE's upon which it would generically depend. In contrast to the ICE which is concerned with the *manifestation_t*, the advantage of having an entity that specifically refers to the *expression_t* is that it allows for any given ICE to be encoded into different formats without ever losing track of the genetic relationship that subsists between the different encodings thereof.⁵⁸⁹

In other words, if the ICE can be regarded as a GDC that subsists at the level of the *manifestation_t*, the *expression_t* could instead be defined as a GDC that subsists at a higher level of abstraction. The basic idea is that a GDC is ultimately a pattern which can theoretically subsist at any given level of abstraction. According to the terminology of the FRBR, if the *manifestation_t* can be regarded as a pattern that articulates a specific piece of content into a particular format, the *expression_t* qualifies instead as a more generic pattern that articulates a specific arrangement of signs and symbols regardless of the format they assume or the medium they have been embodied into. As such, this particular GDC would allow for the various instances of a work to be identified according to the content they incorporate but without actually accounting for the way in which they are being conveyed to the public.

As a particular GDC, the content of any given work of authorship could potentially inhere into an indefinite number of media. For instance, in the case of Hamlet, even though the literary work, as it was originally drafted by William Shakespeare, was initially incorporated into the specific instance of a manuscript, the

⁵⁸⁹ With the exception of the first fixation of a work, every new manifestation of one particular expression of the work necessarily derives (either directly or indirectly) from a previous manifestation thereof. For instance, as a general rule, a new manifestation is produced whenever a particular expression is being either converted into a new format (e.g. a photograph can be turned into a digital image as a result of digitization, or a particular melody can be converted from the MP3 to the OGG format) or translated into a new format (e.g. whenever a literary work is introduced into the lyrics of a song). A new manifestation is also generated whenever the expression is being reproduced or incorporated into a new medium (e.g. whenever a manuscript or a painting is being reproduced into a new medium, or when the content of a hard-cover edition is being extracted and subsequently incorporated into the corresponding soft-cover edition). Every one of these manifestations is a distinct and separate entity which is however related to the others by reason of their common origin, i.e. the particular expression of a work. For more details, see IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records.

specific content thereof could easily be extracted and reproduced into a different medium of expression according to different typographical arrangements. As such, while the two instances of the work would actually differ in their manifestation_t, they would nonetheless qualify as two manifestations_t of the same expression_t and should therefore ultimately be regarded as two instances of the same GDC.

D. WORK — DEFINED CLASS

Finally, because of its abstract and conceptual character, the work_t, as a general concept, is not recognized within the realist framework of the IAO.

In contrast with the FRBR, where the work_t (e.g. Hamlet by Shakespeare) qualifies as a generic entity which can be instantiated into many works of different natures (such as, e.g. a literary, dramatic, musical or artistic work), within the context of the IAO, the work_t may only qualify as the particular instance of a type (e.g. Hamlet's literary content constitutes the instance of a literary work, whereas the choreographic content thereof constitutes the instance of a dramatic work) which can only be instantiated into an analogous medium of expression.

The reason is that the hierarchical structure of the BFO does not allow for any given node to have more than one parent. Every node of the ontology represents a particular category of entities that subsist at different levels of generality and which are connected to each other by a series of branches that express a relationship of subsumption or inclusion.⁵⁹⁰ However, an important requirement of the BFO is that one specific category cannot be subordinate to more than one other class of entities.⁵⁹¹ As a result, while, in the FRBR framework, Hamlet can potentially be instantiated into both a literary and a dramatic work (i.e. Hamlet as a work can be articulated into a variety of expressions_t), in the context of the IAO, if Hamlet qualifies as an instance of a literary work, it cannot also constitute an instance of a dramatic work.

Through the notion of a defined class it is however possible to ensure that the BFO's principle of single asserted hierarchy be respected while nonetheless allowing for the various instance of a work to be identified as

⁵⁹⁰ An ontological framework is concerned with the establishment of the taxonomical structure of a particular portion reality, as well as with the development of a partonomy for its corresponding entities. The former connect different types of entities together according to a relationship of subsumption (e.g. the category of cats is a sub-category of the category of mammals), whereas the latter relates different entities according to a whole-part relationship (e.g. the tail of a cat constitutes a part of the cat). For more details on the distinction between a taxonomy and a partonomy, see e.g. GORSKA, E. (2003) On partonomy and taxonomy. *International review of English Studies*.

⁵⁹¹ The design of the BFO relies upon the principle according to which the structure of well-formed ontology should take the form of a mathematical tree which does not admit any cycles. In other words, while every node of the tree represent a particular category of entities which must necessarily include the totality of entities belonging to the sub-category thereof, each category must also be defined in such a way that it can only be included into one of the upper level nodes. Accordingly, if different categories are such that their respective instances overlap with each other, one must necessarily be regarded as a subcategory of the other. For a better overview of the requirements for designing a proper ontology, see e.g. SMITH, B. (2003) Ontology and Information Systems. IN FLORIDI, L. (Ed.) *Blackwell Guide to the Philosophy of Computing and Information*. Oxford, Blackwell.

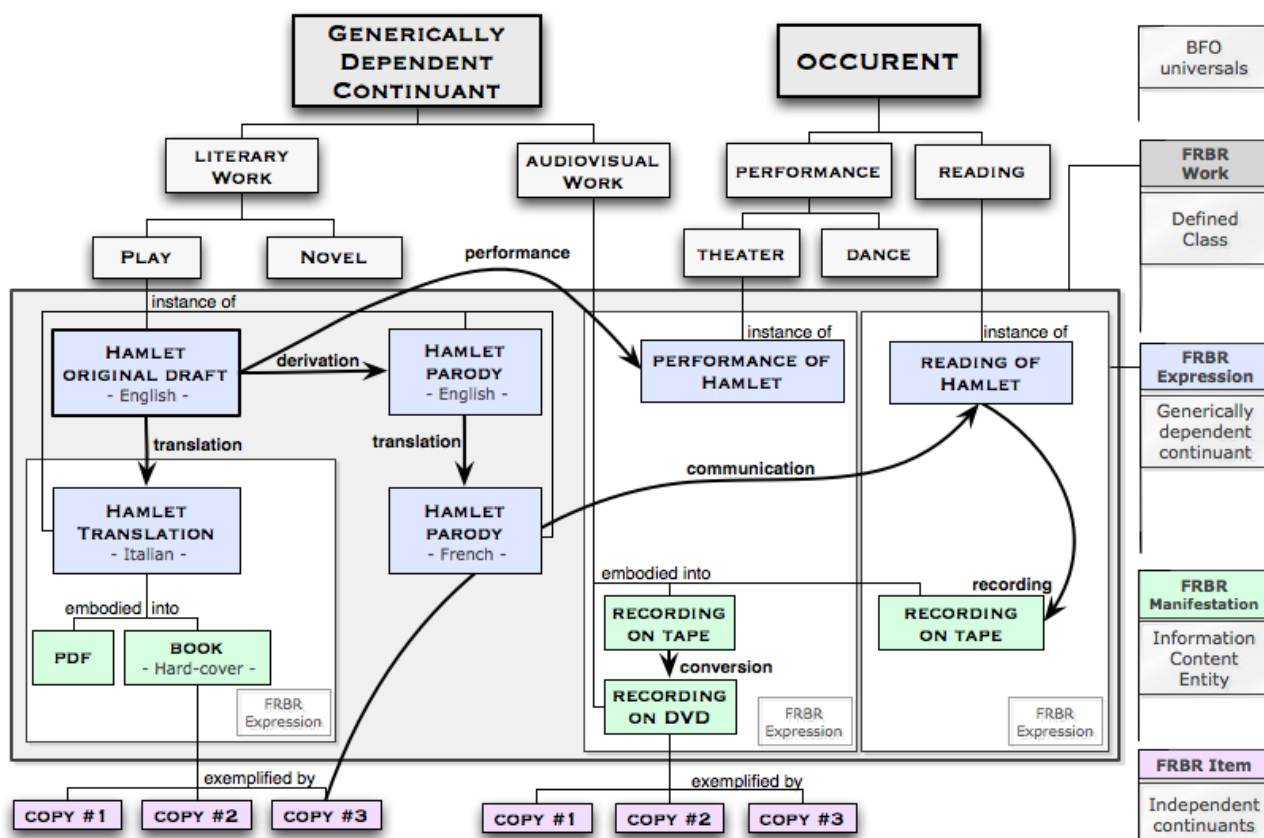
the members of a common category of entities.⁵⁹² As opposed to universals which categorize entities according to patterns that are repeated in nature, a defined class is ultimately the product of a discretionary choice to regroup entities together according to one or more arbitrary criteria. A defined class thus represents a potential understanding of a particular portion of reality which reorganizes entities within a specific category and for a defined purpose.⁵⁹³ As such, the notion of the work could theoretically be simulated by means of a defined class which would basically regroup a particular set of entities under a common framework insofar as they all articulate an identical or analogous concept.

For the purposes of classification, it may therefore be useful to employ a specifically defined class ('the work of Hamlet') in order to regroup the various instances of that GDC together within the same category. As a result, while every implementation of the work of Hamlet into a particular ICE necessarily qualifies as the individual instance of a class (e.g. the implementation of Hamlet as a literary work qualify as the instance of a 'literary work'), Hamlet as a general concept could also be defined as a particular class of entities that would essentially comprise every possible instantiation of Hamlet into a particular ICE.

Instead of being related by a relationship of subsumption (*is_a*) or through a relationship of inclusion (*part_of*), the different entities that belong to the same class are related to a particular work of authorship by virtue of the mere fact that they belong to the same class (*member_of*).

⁵⁹² According to the principle of asserted single *is_a* inheritance, in the BFO, any term of the ontology may not have more than one parent in the asserted hierarchical structure. As an upper level ontology, in fact, the formal structure of the BFO needs to be easily extensible and interoperable with a maximum number of lower level ontologies. Moreover, a taxonomical structure based on single-parent relationship is likely to be more modular insofar as it can be subdivided into a variety of different parts which can be independently assessed. See SMITH, B. & BROCHHAUSEN, M. (2007) Establishing and Harmonising Ontologies in an Interdisciplinary Health Care and Clinical Research Environment. IN BLOBEL, B., PHAROW, P. & NERLICH, M. (Eds.) *eHealth: Combining Health Telematics, Telemedicine, Biomedical Engineering and Bioinformatic on the Edge*. Amsterdam, IOS Press. Still, the asserted hierarchy of the BFO does however not prevent the inference of multiple *is_a* inheritance. Indeed, although not explicitly asserted in the taxonomy, multiple parent-child relationships can nonetheless be inferred by the means of logical rules. In particular, defined classes have become permitted in the OBI framework in order (a) to allow the definitions of terms that were in use by the community but were not "universals" as determined by the group; and (b) to facilitate organization of OBI as a single asserted hierarchy while allowing for polyhierarchy where appropriate. See http://obi-ontology.org/page/Defined_classes

⁵⁹³ According to the BFO: "Universals are that which is general or abstract in reality. They are the philosophical explanation of the structure, order and regularity that is to be found in nature, and they are what all members of a natural kind, grouping or species (for example the kind 'feline' or 'mammal') have in common. Universals are repeatable in the sense that they can be instantiated by more than one object and at more than one time." Yet, while every universal has a corresponding class, not every class corresponds to a universal. "A class can be defined as a collection of particulars falling under a term in such a way that the term applies to every member of the collection, and every particular to which the term applies is a member of the collection. For example, the class corresponding to the universal 'cat' will be designated by the term 'cat' and will contain all and only the particular cats that exist in reality." However, there are many classes that do not correspond to any universal, and these fall into two general kinds: (1) the first are classes designated by arbitrary general terms (e.g. Nelson Goodman's "grue" category, tuberculosis of unspecified bones and joints, normal pregnancy, injury due to war operations by lasers, railway accident involving collision with rolling stock and injuring pedal cyclist, etc); (2) the second are classes created by using a general term to make reference to particulars existing at a specific time or in a specific place (e.g. the class of all women currently living on the north coast of Germany, the class of all athletes over the age of 30, or the class of all individuals currently infected by HIV on the Continent of Africa). See SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science.



As such, the correlation that subsists between the various entities of the IAO and the FRBR framework is not of immediate application, in particular when it comes to defining the concept of a work_t. An empirical examination may help clarify the situation. To continue with the former example, it may be interesting to investigate the way in which the various instances of a work actually relate to each other and how they can be combined together under a defined class in order to provide a better description of the Hamlet at different layers of abstraction.

To be sure, the original manuscript written by William Shakespeare constitutes one particular instance of a 'literary work'. As a result of translation, a new instance of a 'literary work' is produced, whose overall content is fundamentally the same as the former, in spite of it being written in a different language. Likewise, a revision of the work will necessarily produce a new instance of a 'literary work' whose content is to a certain degree analogous to the former, in spite of the fact that it has been subject to a series of revisions. Hence, even though the different instances of a literary work are to be ultimately regarded as separate and independent entities within the IAO framework, they nonetheless share a common set of characteristics which may eventually be recognized as a class. Indeed, the original manuscript of Hamlet, together with the subsequent translations and/or the revisions thereof, are all expressions_t of the same work_t (in the FRBR sense) which have been however articulated in a different manner.

By analogy, the making of a parody will inevitably produce a new instance of the work_t, which may or may not pertain to the same category as the original instance from which it has been derived according to the degree

of similarity that subsists between the two. In other words, while one parody may qualify as a member of the same class, another parody may instead qualify as a member of a new class insofar as its content is so different from that of the original work_t that the criteria of substantial similarity could no longer be fulfilled.

As opposed to the category of universals for which the pertinence of every member of the class can be objectively ascertained, whether or not an entity can be regarded as pertaining to a defined class does not depend upon any objective criteria, but rather upon a series of subjective considerations and arbitrary judgment.⁵⁹⁴ In the same way that it is often problematic to provide an exact definition of the work_t in the context of the FRBR, the classification of any given entity into one class or the other is ultimately a matter of discretion which is likely to vary according to the context and the purpose of analysis.⁵⁹⁵

This basically means that the identity of a work_t and the corresponding boundaries thereof are likely to differ according to the circumstances in which it is being assessed. As a result, any entity that may actually be regarded as the particular instance of a work_t in a particular context of analysis may eventually be regarded as pertaining to a different class in a different context of analysis.

For instance, in the bibliographical context, every work_t that refers to a same general concept could be regarded as belonging to the same class, regardless of the amount of similarity, the degree of creativity or the originality that was involved in the production thereof.⁵⁹⁶ According to the FRBR, therefore, the original manuscript of Hamlet, as well as every subsequent revision, edition or adaptation thereof are likely to be regarded as members of the same class by virtue of the mere fact that they articulate the same general concept and notwithstanding the fact that they may have different origins or authors.

In the context of the copyright regime, instead, the law has established a series of criteria that should be taken into account in order to determine the extent to which the various instances of a work_t are eligible for

⁵⁹⁴ While universals represent patterns that exist in nature, defined class are generally employed to describe arbitrarily designed patterns that have been identified by man. Accordingly, depending on the way in which the class has been defined, it may sometimes be difficult to determine the boundaries thereof or even just to establish whether or not a particular entity should belong to that particular class. For more details on the difficulties related to the proper definitions of terms within an ontology, see Ibid.

⁵⁹⁵ To the extent that it does not qualify as an actual and identifiable concept with an identity of its own, it is difficult to define the notion of a “work”. Insofar as there is no such thing as a work in the physical world, the identification thereof will always and necessarily be subject to a certain degree of uncertainty. The boundaries between one work and another are fundamentally arbitrary and necessarily depend upon the nature of the work, the anticipated need of users, as well as on a series of other subjective considerations. Moreover, although the identity of the work remains the same over time, its boundaries will necessarily grow as a result of the incorporation of a new expression into the overall scope of the work. Defining the boundaries of a work is therefore a relatively complex task which has to be constantly revised, in particular, when it comes to defining the boundaries of a serial work (e.g. a journal or magazine), the scope of which is specifically intended to grow over time. For more details, see ANTELMAN, K. (2005) Identifying the Serial Work as a Bibliographic Entity. *Library Resources and Technical Services*, 48.

⁵⁹⁶ In a bibliographical context, different instances of a ‘work’ may be classified differently according to the different expectations of users. For instance, one particular classification may include every work that refers to one particular topic under the same category (e.g. all works related to the World War II), while another may decide to separate works into different categories according to their type (e.g. a literary work on World War II does not belong to the same category as an audiovisual work on the same topic).

copyright protection and whether or not any other instance of the work_t should be regarded as an infringing copy thereof.⁵⁹⁷

In this regard, while the criteria of substantial similarity is a necessary condition to determine whether two entities represent an alternative expression of the same work_t, it is not sufficient to determine whether any given expression_t should belong to the same class as another. Indeed, given that copyright law only protects against actual copying, one important requirement is that the various entities that constitute the members of a class be inherently connected to each other by way of a genetic link, in the sense that they must have been somehow derived (either directly or indirectly) from each other.

Hence, with the exception of the first instance of the work of Hamlet (i.e. the original manuscript), every other member of that class must have been obtained through a process of reproduction, revision, adaptation, translation, or any other form of derivation, which eventually resulted in the creation of a new instance of the work.⁵⁹⁸ Conversely, any independent creation that is not genetically related to the original manuscript of Hamlet should not be included into the same category, in spite of the fact that they may convey the same general concept of the work.

⁵⁹⁷ For a detailed overview of the various criteria that must be fulfilled for a particular work of authorship to qualify for protection under the copyright regime and the various conditions that must be accounted for when assessing whether there exists a cause of action for copyright infringement, see *supra* Pat I. Chapter 1: Copyright law. Section 1: Copyright basics.

⁵⁹⁸ A work of authorship is commonly understood as a conceptual entity which subsists independently of the way in which it has been conveyed to the public. Accordingly, a work can potentially be expressed in an indefinite number of ways, which can in turn be concretized into the real world through a variety of different means. This notwithstanding, provided that they all originate from a particular work, every instance of that work basically constitutes a derivative work that is the result of revision, conversion, alteration or adaptation of another instance of the work - be it either the original instance or a derivative product thereof. See, e.g. TANG, P. (1997) Multimedia Information Products and Services: a need for 'cybercops'? IN LOADER, B. (Ed.) *The governance of cyberspace: politics, technology and global restructuring*. Routledge.

COPYRIGHT WORKS

UNDER THE IAO

In view of the distinctive structure of the IAO, the relationship that subsists between copyright law and the various entities that populate this new framework should be once again investigated. In particular, the level of protection granted under the copyright regime is likely to vary according to the level of abstraction at which the work is being analyzed. As a result of the realist approach of the IAO, the various entities that subsist within its ontological framework are strongly associated to the actual entities that exist in reality. While, on the one hand, it may make it easier to identify the different entities to which copyright relates to in the real world, on the other hand, it may introduce a series of obstacles to the analysis of copyright law at any higher level of abstraction.

As opposed to the FRBR, whose structure is generic enough to be adopted by any copyright owner as a means to describe the scope of the rights that are being licensed to third parties, the way the IAO has been designed is too closely related to the physical world to be of any support in the drafting of a copyright license intended for the exploitation of a work at any higher level of abstraction than that of the physical level.

This is not to say, however, that the IAO does not have any role to play in the context of the licensing of rights. Indeed, the structure of the IAO may be particularly valuable in the framework of any end-users licensing agreement that ultimately refers to the digital instance of a work. In this context, in fact, the object of the rights that are being licensed do not actually relate to the *work_t*, to the *expression_t* or to a particular *manifestation_t*, but rather to that specific copy of the work that is being released. The problem is, again, that in order to properly assess the scope of these rights, the identity of that copy has to be precisely established.

SECTION 1

THE SCOPE OF PROTECTION

In view of its realist character, the IAO framework is only concerned with these entities that can actually be observed in reality. As such, the approach of the IAO may result into a series of complications when it comes to identifying the object of the copyright. In particular, the realist approach adopted by the IAO is likely to constitute an obstacle in assessing the different levels of protection granted under the copyright regime to the various entities that populates the ontology.

As a general rule, copyright protection is not concerned with the physical attributes of a work, but rather with these specific aspects of the work that subsist at higher levels of abstraction. Indeed, amongst the various

entities that qualify as an information artifact (i.e. the information content, the information carrier and the information bearer), only the former is actually eligible for protection.

Even though the copyright regime ultimately regulates the exploitation of physical resources, copyright protection is not granted to the information bearer as such (i.e. the independent continuant into which a particular ICE has been instantiated), but is limited to the information content that has been incorporated therein. The use of any medium of expression cannot therefore be governed by the provisions of the copyright regime unless it incorporates an entity that actually qualifies for protection on its own. As such, while the exploitation of an independent continuant that does not qualify as an information bearer can never be subject to the provisions of copyright law, the consumption of an information bearer may or may not be regulated by the provisions of the copyright regime according to whether or not the information content that it incorporates is itself eligible for copyright protection.

This notwithstanding, the information bearer constitutes an important factor to be taken into account when assessing the overall scope of copyright protection. The reason is that copyright law protects the expression of any original work of authorship against the unauthorized exploitation thereof only after it has been fixed into a particular medium of expression (which may sometimes be limited to the brain of the author).⁵⁹⁹ The first fixation of a work into an information bearer is therefore a key component of the copyright regime because it determines the point in which the work as a general concept may eventually become eligible for protection.

Yet, although it represents the trigger for copyright protection, the information bearer into which a work has been originally incorporated does not determine the overall scope of protection that the work may be granted with. Under the copyright regime, in fact, it is the expression of a work that actually constitutes the central element of the work that is eligible for protection. Copyright protection is thus not limited to one particular instance of the work, but could theoretically extend to any other instance of the work which incorporates analogous expression. As such, an ontological framework should be able to identify the expression as a separate entity with an identity of its own, in order to determine whether different information bearers actually incorporate different representations of an identical expression (in spite of the fact that they may assume a different format or manifestation), or whether they ultimately amount to separate expressions of the same work which are thus less likely to infringe upon each other.

More precisely, the main criterion used to establish whether a particular work is to be regarded as an infringing work - or whether a derivative work should belong to the same category as the original work from which it is

⁵⁹⁹ In a large number of common law jurisdictions, the copyright regime requires that in order to qualify for protection certain works have to be fixed into a tangible medium of expression, in such a manner that it is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration. See, for instance, section 101 and section 102(a) of the Copyright Act of 1976 in the USA; section 3 of the CDPA of 1988 in the UK (which excludes artistic works from the fixation requirement), section 3(2) of the Copyright Act in Canada (which only applies to dramatic works), etc. Civil law jurisdictions do not specifically require that a work be fixated into a physical medium of expression in order for it to become eligible for protection, but it is implicit into the system that a work cannot be protected unless it has at least been fixated into the memory of the author or any other person to whom the work has been communicated. For a broader overview of the implementation of the copyright law in the various jurisdictions, see CREWS, K. D. & RAMOS, J. (2006) *Comparative Analysis of World Copyright Law. Copyright Management for Scholarship*. Zwolle, Netherlands.

derived - is directly related to the doctrine of substantial similarity. This doctrine basically identifies the minimal threshold of similarity that is required in order to establish a cause of action for copyright infringement.⁶⁰⁰

According to the law, therefore, the scope of copyright protection extends far beyond the first instance of the work. On the one hand, given that the copyright ultimately vests in the expression of the work (as opposed to the physical representation thereof), protection will be granted to any other information bearer which incorporates the same information content, provided that it is related to the former by reason of its origin. On the other hand, given that the scope of copyright protection is sufficiently broad to take into account the making of derivative works, protection could potentially be granted to any other information bearer that incorporates a different expression, provided that it articulates the same general concept of the work in a different, albeit substantially similar manner.

As a result, the scope of the copyright vesting in a work is inherently dynamic and is likely to evolve over time so as to eventually encompass every information bearer which incorporates either (1) the same information content, or (2) a different information content which nonetheless articulates the same general concept of the work (e.g. in the case of non-literally copying).

Yet, given that copyright law only protects against actual copying, protection will only be granted to every new instance of the work which has been directly or indirectly derived from the original instance of the work. Under the copyright regime, therefore, a cause of action may only be established if it can be proven that the allegedly infringing work actually originates from the work for which infringement is claimed.⁶⁰¹ In order to determine the scope of copyright protection, the genetic relationship that subsists between the original instance of the work and the successive versions thereof must therefore be taken into account.

As such, the first fixation of the work into a particular medium of expression is crucial because it constitutes the first instance of the work - which basically represent the original entity from which all other instances of the work can be derived.

In spite of the fact that they all derive from that very same copy of the work, not every derivative work is likely to qualify as an instance of the same work. Different types of revisions, adaptations, modifications, or other

⁶⁰⁰ The doctrine of substantial similarity establishes the minimum level of similarity that is necessary to demonstrate that copyright infringement has occurred after the fact of copying has been proven. Substantial similarity does not necessarily have to refer to verbatim copying and should theoretically be assessed in terms of both quantity and quality. As a general rule, in assessing substantial similarity, account should also be taken for the degree of creativity that was involved both in the original and in the derivative work. Determining whether or not copyright infringement actually occurred is therefore a fundamentally subjective task which can only be resolved on a case-by-case basis. For a more detailed overview of the doctrine of substantial similarity and its role in the assessment of copyright infringement, see e.g. PARTRIDGE, M. V. B. (1999) Copyright litigation: Understanding substantial similarity and scope of protection. *IP Litigator*, May/June.

⁶⁰¹ According to the copyright regime, the independent creation of a work that is substantially similar or even identical to another does not constitute an infringement of the copyright, because copyright infringement cannot subsist if there has not been copying. This allows for independent creations to be produced without fear of liability under the copyright regime. See CHAFEE, Z. (1945) Reflections on the Law of Copyright. *Columbia Law Review*, 45, 503-529.

transformative processes are likely to produce very different outcomes. These outcomes may or may not be regarded as belonging to the same work depending upon the degree of similarity that subsists between two. On the one hand, to the extent that they incorporate an expression whose content is substantially similar to that of the original work, a number of derivative works may actually qualify as an instance of the same work. On the other hand, insofar as their content substantially differs from that of the original work, other derivative works may ultimately give rise to a new entity which would actually qualify for a copyright on its own.

Assessing whether or not a derivative work can be regarded as a new instance of the work from which it has been derived is however a rather subjective process which can only be performed on a case-by-case basis. Yet, even though there is no definite and reliable mechanism of objectively determining whether the making of a derivative work would actually result in copyright infringement,⁶⁰² it is nonetheless possible to establish a series of criteria that may facilitate the overall assessment of the matter.

The idea is to account for the particular process or function that has been adopted in order to derive the latter from the former. Different functions are in fact associated with a different level of probability with regard to whether or not they are likely to lead to the creation of a new entity, which may qualify as either a new and independent work *per se* or as the instance of a previous work.

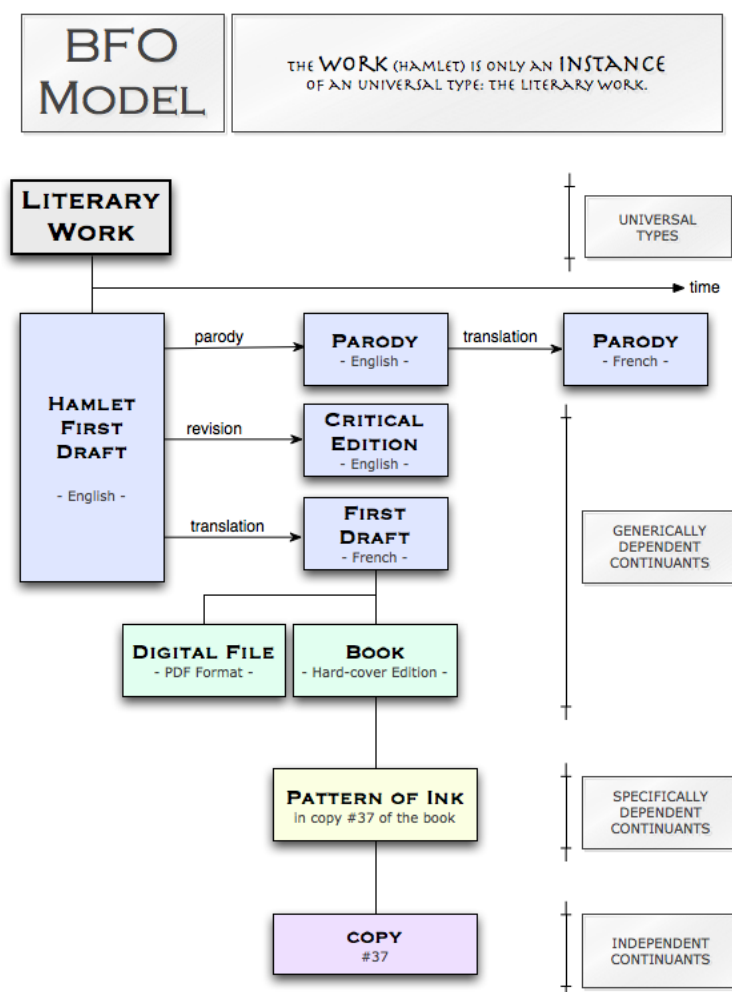
As a general rule, only the reproduction of a work can be said to always and necessarily result into a new instance of the work. Still, it may be generally assumed that the revision, edition, conversion or translation of the work is likely to produce a new instance of the same work to the extent that it incorporates an expression which is substantially similar to that of the original work. Likewise, the performance or the recording of a work is almost certainly going to produce a new instance of the same work, which is identical in every aspect but for the medium of expression. Conversely, the criticism, commentary or critical review of a work is more likely to produce the instance of a new work, whose expression would subsist independently of the expression of the original work, in spite of it actually referring to the actual content thereof. Finally, there exist a number of borderline situations, such as the making of a parody or the adaptation of a work, which may qualify as either an instance of the same work or as the instance of a new work. The qualification as one or the other depends upon the extent to which their content actually differs from that of the work from which they have been originally derived.

With the exception of the reproduction process, determining the scope of copyright protection according to the genetic relationship or transformative function that subsists between the different instances of a work is ultimately an arbitrary task, the outcome of which is fundamentally questionable insofar as it necessarily entails

⁶⁰² Although the copyright regime prescribes that copyright protection shall apply regardless of the artistic merits of a given work, it is often the case that certain works are refused protection because of their obscene or offensive content. See COHEN, A. B. (1991) Copyright Law and the Myth of Objectivity: The Idea-Expression Dichotomy and the Inevitability of Artistic Value Judgements. *Indiana Law Journal*, 66. Moreover, the minimum threshold of originality is not explicitly defined by the law and is therefore ultimately to be determined on a case-by-case basis by judges. See OLSON, D. P. (1983) Copyright Originality. *Missouri Law Review*, 48. Besides, in order to establish a cause for copyright infringement, the substantial similarity requirement of the copyright regime is generally too vague and does not provide copyright owners with sufficient predictability regarding the scope of protection of their works. See e.g. WURZER, M. (1989) Infringement of the Exclusive Right to Prepare Derivative Works: Reducing Uncertainty. *Minnesota Law Review*, 73.

a minimum level of subjective judgment. These principles should therefore merely be regarded as a series of guidelines rather than as a decisive set of rules.

With regard to the work of Hamlet, for instance, the original manuscript written by William Shakespeare constitutes the first fixation of the work into an information bearer. Ever since the first instance of the work has been created, many other versions of the work have been produced by many different authors with the intention of articulating the very same concept of the work into a different format or in another manner. Many of these works can actually be regarded as an instance of the ‘work of Hamlet’ because of the similarity they bear to the original instance thereof. Others may considerably differ from the original work and should therefore be regarded as separate works with an identity of their own. Besides, regardless of the level of similarity that can be observed, any instance that is not genetically related (either directly or indirectly) to the original manuscript of the Hamlet should not be included into the same category, but should instead be regarded as an independent creation which is ultimately subject to a different copyright.



THE OBJECT OF THE RIGHTS

With regard to the licensing of rights, identifying the different instances of a work accordingly to their genetic relationship with the original fixation of a work is likely to be inconvenient and excessively constrictive.

As a general rule, right holders are entitled to subdivide their exclusive rights indefinitely and to license them at any layer of abstraction (i.e. to the work_t, to a particular expression_t or manifestation_t, or only to a particular item_t) and at any level of granularity (i.e. to the work as a whole or only with regard to one or more parts thereof).⁶⁰³

Accordingly, in order to be employed in the context of a copyright license, an ontology should be capable of describing the work as an abstract entity which could potentially be observed at different levels of abstraction and at different degrees of granularity.

In particular, in the framework of the licensing of rights, an accurate description of any licensing agreement can only be provided through the formalization of its corresponding terms and conditions and the identification of the individual components of the work they refer to. Hence, in addition to defining the relationships that subsists amongst the various components of the work, a proper ontological framework should provide a specialized terminology allowing for the object of the rights granted under a copyright license to be described according to the actual level of abstraction and the specific degree of granularity that they ultimately refer to.

The IAO has however adopted a realist approach in which every term of the taxonomy necessarily refers to an entity that actually exists in reality.⁶⁰⁴ As such, it does not actually provide the means to distinguish between the different aspects of a work that subsist at any of the higher levels of abstraction. Under the IAO, it may therefore be difficult to identify the object of the rights granted under a commercial copyright license which purports to regulate the exploitation of the work_t or a particular expression_t of that work_t.⁶⁰⁵ Indeed, while the terminology of the FRBR is sufficiently abstract to identify a particular set of entities that could be

⁶⁰³ The principle of divisibility of copyright rights recognizes the fact that the copyright basically amounts to a collection of individual rights which can be severed indefinitely into a series of smaller individual rights. Not only can the exclusive rights granted under copyright law be transferred separately, but they can also be further subdivided into a series of more limited rights which can in turn be transferred independently. As such, rights may be granted at different levels of abstraction and at different levels of granularity (i.e. to the work as a general concept, to a particular expression of the work, to only a particular element thereof, or to that particular section presented into a specific format, etc). For a more general overview, see e.g. GROFFMAN, E. (1979) *Divisibility of Copyright: Its Application and Effect*. *Santa Clara Law Review*, 19.

⁶⁰⁴ A realist ontology is concerned exclusively with the description of things that actually exist in the real world, regardless of their physicality (i.e. whether they are tangible or not). Its purpose is to describe a particular domain of reality by identifying the entities that the world is made of, as well as the manner in which these entities relate to each other. Under a realist approach, the ontological analysis of a fragment of reality must therefore trace every entity that is being represented back to a particular thing that is observable in the physical world. For more details, see e.g. GUBA, E. C. (1990) *The Alternative Paradigm Dialog*, Sage Publications.

⁶⁰⁵ Given that the ICE has been declared to subsist at level of the manifestation, the standard terminology of the IAO does not include any entity that would basically allow for the commercial exploitation of a work to be regulated at any higher layer of abstraction.

used to approximate the object of copyright protection,⁶⁰⁶ the terminology of the IAO does not include any entity that is able to describe either the work_t or the expression_t.

Because of the intangible nature of information, an ontological framework based exclusively upon a realist approach is unlikely to be satisfactory. For instance, in the context of bibliographical records, in order to properly identify, classify, and retrieve bibliographical information, it is more convenient to describe a work according to its content and independently of its format.⁶⁰⁷ Most importantly, in the context of copyright law, being able to identify the various entities that constitute a particular work of authorship at higher levels of abstraction is likely to be valuable both from the perspective of right holders - to establish a cause of action for copyright infringement, and from the perspective of end-users - to investigate upon the legitimacy of a particular exploitation of the work.⁶⁰⁸

If the IAO were to be employed to describe the object of a copyright license concerned with the commercial exploitation of a work, its ontological framework should thus comprise at least one term to describe the work_t as a general concept and one to describe the actual expression_t to which the copyright refers.

⁶⁰⁶ Although there is no direct correspondence between the entities identified within the FRBR framework and the various entities that the provisions of the copyright regime refer to, the expression of a work as it is understood within the FRBR is perhaps the best candidate to represent the actual object of the copyright, even though its scope is much more narrow than the scope of the expression as it has been defined under copyright law. For more details on the relationship that subsists between copyright and the various entities of the FRBR framework, see *supra* Chapter 2. Section 2: The FRBR Approach. C: Relationship with Copyright Law.

⁶⁰⁷ For instance, it is often the case that when people are looking for a particular piece of text written by a particular author, they are usually not concerned with the edition into which the work has been published or the specific font which has been employed. In fact, every manifestation of the same work could eventually be regarded as being equivalent insofar as they all incorporate the same expression. According to the corresponding needs of users, different criteria may be used in order to locate a particular piece of information. In the digital world, where digital technologies allow for the same content to be conveyed in many different ways according to the context, the manifestation of a work does not therefore always constitute the most appropriate criteria for the identification of a particular resource. See, for instance, DANSKI, A. & CHAPMAN, A. (2003) Bibliographic Records in the Computer Age. *Library and Information Update*, 2, 42-43.

⁶⁰⁸ Not only does the copyright vesting in a work precludes anyone from reproducing and disseminating the work to the public without the consent of the author, but it also prohibit the making of derivative works which are substantially similar to the original work. Accordingly, while right holders necessitate of a way to determine whether or not different instances actually incorporate a substantial part of their respective works, any commercial user or end-user, who may or may not have acquired a particular license, needs also be capable of identifying what is the actual content that is protected by the copyright regime in order to ensure that a particular exploitation of the work is indeed legitimate. Any ontology that constitute the basis of a particular Rights Expression Language (REL) must therefore be designed in such a way that it is capable to support both the interests of copyright owners, who are for the most part concerned with protecting their works against the unauthorized exploitation thereof, and the interests and the standard expectations of users, who are mainly concerned with the accessibility of these works and the ease by which they may be able to identify them and put them into use. See, e.g. ROSNAY, M. D. D. (2003) Cognitive Interfaces for Legal Expressions Description - Application to Copyrighted Works Online Sharing and Transactions. IN BOURCIER, D. (Ed.) *Legal Knowledge and Information Systems. Jurix 2003*. Amsterdam, IOS Press.

As it has been formerly illustrated,⁶⁰⁹ one advantage of the IAO over the FRBR is that, in spite of its realist approach, its structure is flexible enough to allow for the introduction of specifically defined classes. Depending upon the way in which they have been defined, these classes can be used to regroup an indefinite number of entities under a common umbrella, according to an arbitrary set of criteria. As such, they could potentially be used as a means to identify the various entities that represent the particular concretization of a work into the real world. Yet, depending upon the layer of abstraction that is taken into account, different criteria would have to be fulfilled in order for an entity to be regarded as a member of the class. Accordingly, even though the terminology of the IAO does not provide any such entities within its standard framework, a series of specifically defined classes could theoretically be implemented in order to emulate the concept of the *expression_t*, and, eventually, the notion of the *work_t* as a general concept.

While the physical *item_t* can immediately be described through the notion of the information bearer, a more thorough analysis is required in order to identify the entities that could eventually be employed to describe the other aspects of a work.

When it comes to the licensing of rights vesting in the *manifestation_t*, the ICE is probably the best candidate to represent the object of these rights. In fact, given that the ICE and its corresponding subclasses - such as, e.g. textual entities, graphs, images - ultimately subsist at the level of the *manifestation_t* (in the FRBR sense), the ICE can only be used to license the rights vesting in a particular *expression_t* to the extent that it has been encoded into a particular format and incorporated into a specific medium of expression.

Such a limited scope may however be inconvenient in many cases where the actual format of the work is considered to be irrelevant for the exploitation of the copyright vesting in the work. In particular, in the digital environment, the possibility to identify a work at any higher level of abstraction than that of the *manifestation_t* might turn out to be extremely useful in the framework of DRM systems. Indeed, given that the mere transfer of a digital file from one proprietary system to the other is likely to require the conversion of that file into a new digital format, relying upon the *manifestation* in order to identify a particular resource on the Internet is likely to produce a series of inefficient results.

The problem is that the terminology of the IAO does not provide any entity that is sufficiently abstract and generic to be capable of describing the notion of the *expression_t*. In fact, to the extent that the *expression_t* has been defined independently from any characteristic of form or layout that it may assume whenever it is incorporated into a specific document, the identity of an *expression_t* exclusively depends upon the content of the work. Even though it cannot as such qualify as a universal, a series of defined classes could be eventually introduced within the framework of the IAO in order to implement the notion of the *expression_t*, as it is understood in the context of the copyright regime.

⁶⁰⁹ The structure of the IAO is sufficiently flexible to allow for the introduction of additional entities within its own taxonomy, in order to represent new concepts that can be described by means of defined classes. See *supra* Part II. Chapter 9: The IAO approach. Section 4: Relationship with the FRBR.

Under this scheme, therefore, the expression would basically be regarded as a particular GDC that merely describes the specific pattern of signs and symbols which represents a particular expression of a work, regardless of the way in which it is being conveyed to the public.⁶¹⁰

Moreover, it may sometimes be necessary for the owners of the copyright in a work to license their copyright with reference to the work_t, as opposed to only a particular expression_t or manifestation_t. Because it does not subsist in the real world, however, the IAO is unable to incorporate the notion of the work_t within the framework of its basic terminology. The only way to describe the general concept of a work_t within the context of the IAO is through the implementation of a defined class that would basically comprise a series of patterns (or GDC's) which can be regarded as a particular expression of the same work.⁶¹¹

As such, the IAO could theoretically implement a taxonomical structure that is capable of describing how the various terms and conditions stipulated into a copyright license actually relate to the various aspects of a work. By means of these newly established entities, it would therefore be possible to rely upon the framework of the IAO in order to describe the object of the rights granted under any copyright license, regardless of the level of abstraction they refer to.

Indeed, while the object of the rights vesting in one particular instance of the work could be identified by virtue of the information bearer, the scope of the rights vesting in the manifestation_t of the work could be defined by way of a particular ICE, whereas, any right vesting in the work_t as a general concept or any expression_t thereof could theoretically be described by means of a defined class.

This framework would ensure that the IAO is capable of distinguishing between the various aspects of a work in a way that is more consistent with the approach thus far adopted by the FRBR. Moreover, in view of the increased flexibility provided by these defined classes, this new framework could ultimately allow for the IAO to implement a more complete and comprehensive taxonomy and to consequently achieve a more accurate description of what constitutes information in different fields of endeavor. Yet, in the case of most end-user licensing agreements concerned with the exploitation of one particular instance of the work, identifying the constitutive elements of the work is not as relevant as the need to identify the scope of that particular copy of the work that is being licensed.

A specific assessment of the manner in which the concept of a copy can be represented within the IAO is therefore necessary.

⁶¹⁰ For more details on the way in which the expression – as the entity has been defined in the FRBR – could potentially be emulated in the IAO, see *supra* Part II. Chapter 9: the IAO approach. Section 4: Relationship with the FRBR. Subsection c: Expression – Generically Dependent Continuant.

⁶¹¹ For more details on the way in which the work as a general concept – as the entity has been defined in the FRBR – could potentially be emulated in the IAO, see *supra* Part II. Chapter 9: the IAO approach. Section 4: Relationship with the FRBR. Subsection d: Work – Defined class.

THE CONCEPT OF A COPY

However complicated it may be to establish equality between the different instances of a work, or even just to determine equivalence amongst the instances of one specific expression or manifestation thereof, it should always be possible for end-users to determine what constitutes the copy of a work. Yet, to the extent that it does not actually amount to any concrete entity *per se*, the identity of a copy ultimately depends upon the way in which it has been defined in the relevant context of analysis.

In the framework of the copyright regime, the copy of a work should be defined according to the role it plays in the mind of both right holders and end-users. In particular, to the extent that it constitutes the ultimate unit of consumption, the copy of a work is basically what determines the scope of application of the terms and conditions of a copyright license. Being able to properly establish the identity of a copy is thus necessary in order to determine the extent to which the various rights and obligations granted under any end-user licensing agreement ultimately apply to the different instances of a work. Accordingly, just as it has been done in the context of the FRBR, it is necessary to determine how to establish the identity of any given copy of a work within the framework of the IAO.

According to the previous analysis, in the FRBR framework, the concept of a copy fundamentally refers to the physical item into which an instance of the work has been incorporated.⁶¹² By analogy, it would be natural to assume that, when it comes to the IAO, the concept of a copy ultimately refers to the information bearer (i.e. the independent continuant into which a work inheres). Any given ICE can in fact be incorporated into an indefinite number of independent continuants, which may all qualify as information bearers by virtue of the fact that they incorporate a unique information carrier which instantiates that particular ICE.⁶¹³ As such, every independent continuant that incorporates a particular instance of a work should therefore be regarded as an individual copy of the work which distinguishes itself from the others by virtue of its physical properties.

The notion of a copy plays an important role in copyright law because, by the mere fact of acquiring a copy, users do not necessarily obtain the right to use or to exploit a work as they wish. Indeed, even though they are entitled to enjoy the work by means of the particular copies they own, users do not enjoy the right to

⁶¹² In the FRBR framework, the item of a work is defined as a concrete entity which represents the instance of a physical object that incorporates a particular manifestation of the work. In other words, the item refers to real world objects (such as, e.g. the copy of a monograph, the copy of a recording) which constitute the means by which the work can be experienced by the public. As such, each individual item should therefore be regarded to constitute one individual copy of the work. For more details on how the item can be regarded as the copy of a work in the physical environment, see *supra* Part II. Chapter 8: Copyright works under the FRBR. Section 3: The Concept of a Copy.

⁶¹³ According to the IAO, any independent continuant can be regarded as a member of the defined class of 'information bearers' to the extent that it incorporates a particular information carrier which constitutes an instance of an ICE. As such, the information bearer within the IAO can therefore be considered tantamount to the item in the FRBR framework, as both entities are ultimately intended to designate a physical object which incorporates the particular instance of a work. For more details on the similarities between the various entities that populates the IAO and the frameworks, see *supra* Part II. Chapter 9: the IAO approach. Section 4: Relationship with the FRBR.

reproduce these copies or exploit the work by any other means.⁶¹⁴ It is therefore important to establish the identity of a physical copy in order to determine the scope of the rights accorded to the respective owners thereof.

In particular, even though they actually own the physical copy as a tangible piece of property, users are nonetheless precluded from freely disposing of their property by virtue of the fact that it incorporates a work protected by intellectual property laws. Every user who acquires a particular copy of the work is therefore entitled to dispose of that copy only to the extent that doing so would not infringe the copyright vesting in the work_t, the expression_t, or the manifestation_t. As a result, even if end-user licensing agreements are fairly uncommon in the context of physical works, the sale of any physical copy could theoretically be regarded as a contractual lease, in which only a particular set of rights are actually granted to the users, while the others remain the sole property of the copyright owner.⁶¹⁵

For instance, anyone who has legitimately acquired a book will be entitled to do anything with that particular copy of the book, such as e.g. reading it, writing on it, or even ripping its pages off or burning it, but only to the extent that it does not go beyond the scope of what is normally regarded as being permitted within the framework of copyright law. While reading the book to a friend will therefore qualify as a legitimate act, reading it in front of a public is instead likely to constitute an infringing act insofar as it would qualify as a communication to the public. Similarly, while photocopying certain parts of the book for private use is likely to be regarded as a legitimate activity, the reproduction of a substantial part of the book in the context of a commercial activity will definitely be regarded as an infringing act.

Moreover, given that they enjoy a proprietary right over their personal copy of the book, unless they have been precluded to do so by contractual means, users are generally entitled to sell, loan, or otherwise dispose of that copy as they best see fit, regardless of the exclusive right of distribution which has already been exhausted for that particular copy of the work.

⁶¹⁴ The right to the physical ownership of an information bearer does not imply the ownership of the information content entity that is embodied therein. Indeed, any user who purchased a book, a CD, or any other information bearer, merely purchased the physical copy of a work, whose copyright is however owned by someone else. As such, unless they obtain a specific copyright license, users are not entitled to exploit the work in any other way than what is technically allowed by the particular copy they own. For more details on the standard bundle of rights conferred to the owners of the particular copy of a copyright work, see e.g. LIU, J. P. (2001) *Owning Digital Copies: Copyright law and the Incidents of Copy Ownership*. *William and Mary Law Review*, 32.

⁶¹⁵ Given that anyone who purchases the copy of a copyright work cannot exercise its rights to the extent that they would infringe upon the copyright vesting in the work, the sale of a physical copy could theoretically be regarded as a lease, where users are only entitled to use the object according to a particular contractual agreement which stipulates what the user can or cannot do with that particular copy of the work (i.e. according to the same principle that governs most EULAs in the case of digital works). Yet, such a contractual agreement could only succeed in so far as it can be backed up by the underlying copyright in the work. Indeed, contractual rights fundamentally differ from the exclusive rights granted under the copyright regime to the extent that the copyright is a right *in rem* (enforceable against the world at large), whereas contractual agreements may only give rise to rights *in personam* (enforceable against parties to the contract). For a more general overview, see ELKIN-KOREN, N. (1997) *Copyright Policy and the Limits of Freedom of Contract*. *Berkeley Technology Law Journal*, 12.

In view of the direct correlation that subsists between the notion of a copy and the physical instance of a work, identifying the various copies of a work can therefore easily be achieved in the physical world. Yet, given that this correlation does not subsist in the digital environment, establishing the identity of a digital copy is likely to be much harder.

SECTION 4

DIGITAL CONCERNS

Albeit a relatively straightforward procedure in the physical environment, identifying the actual scope of a copy may constitute a much more challenging task in the digital world.

As it has been previously established, in the physical world, the copy of a work ultimately refers to that particular information bearer into which the work inheres. In spite of its benefits and simplicity, this solution cannot however be applied by analogy in the digital world.

Indeed, in the digital environment, the information bearer no longer has any significant role to play in establishing the identity of a digital copy. As soon as a particular work has been embodied into a digital file, in fact, the latter may inhere into an indefinite number of digital devices which would thereby qualify as information bearers for a particular amount of time. Yet, in view of the specificities of the digital medium, even though they each incorporate an individual instance of the work, they cannot as such qualify as a distinctive copy of the work.

The reason is for the most part related to the ephemeral nature of digital resources and to the temporary character of their physical representation in the tangible world.⁶¹⁶ In the physical world, the property of being an information bearer is persistently associated with the independent continuant to which it refers (i.e. after an independent continuant has assumed the quality of an information bearer, it can later hardly surrender it). In the context of digital works, instead, an independent continuant may constantly gain, lose and regain the quality of an information bearer. A digital file may in fact freely move from one medium to another without leaving any traces whatsoever. Given that they are not affected with any permanent or irreversible consequences, the various media that a digital file has gone through can no longer qualify as an information bearer after the digital file has been transferred elsewhere.

In the digital realm, the character of being an information bearer merely amounts to a temporary feature of the medium, which may or may not be retained and/or regained over time.

⁶¹⁶ Electronic resources are inherently transient. While digital content can be reproduced indefinitely on a variety of media, it is also ephemeral to the extent that it can be deleted without leaving any traces and insofar as the life of digital media is limited in time as a result of physical and technological obsolescence. For more details on the temporal character of content stored into an electronic format, see e.g. BIDE, M., POTTER, L. & WATKINSON, A. (1999) Digital Preservation: An introduction to the standards issues surrounding the deposit of non-print publications. *Library and Information Commission Research Report 23*. British National Bibliography Research Fund.

As a result, the physical medium into which a digital work has been incorporated cannot itself be regarded as a particular copy of the work, but merely as a support on which a digital instance of the work may subsist for a limited period of time. To the extent that it should be able to preserve its identity over time and that it should be recognized as such, regardless of whether or not it has been transferred from one device to the other, the copy of a digital work necessarily qualifies as a more generic entity which subsists independently of the physical characteristics of the medium into which it currently inheres.

In view of the different set of rules that govern the digital environment, the copyright regime should not rely upon the same principles to regulate the physical and the digital world. The notion of a copy according to copyright law should therefore be adjusted to the digital environment through the establishment of a particular set of criteria to determine the conditions according to which a digital copy can be identified and consistently recognized as a single entity even as it is transferred from one place to another.

THE IDENTITY OF DIGITAL COPIES

Copyright law is ultimately concerned with the concept of a ‘copy’. Whether it refers to a physical or a digital entity, the copy of any work of authorship can be regarded as the ultimate unit of consumption. In the context of the licensing of rights, identifying the scope of a copy is therefore necessary to understand the extent to which the various instances of a work can be legitimately used or consumed. In both the physical and digital environment, the concept of a copy can be employed to distinguish between the various instances of a work to which a particular copyright license is supposed to apply.

In view of the recent deployment of DRM systems and the increasing popularity of Open Content licenses, the need to determine the identity of a copy has become crucial in the digital environment. On the one hand, DRM systems rely on technological measures of protection in order to enforce the terms and conditions under which a particular copy of the work is being licensed.⁶¹⁷ On the other hand, Open Content licenses incorporate the terms and conditions of a copyright license directly into the individual copies of the work.⁶¹⁸ According to both models, therefore, the copy is what constitutes the ultimate unit of analysis. In the case of Open Content licenses, the ‘copy’ is the entity that is actually subject to the terms and conditions of the license - which must therefore be included into every ‘copy’ of the work, whereas, in the case of DRM systems, the ‘copy’ is basically the entity whose exploitation is regulated by specific technological measures of protection.

The concept of a ‘digital copy’ is assuming an increasingly relevant role in the context of most end-user licensing agreements. As a result, the ability for any digital device to identify the various entities that may qualify as a particular copy of the work has become a necessity, which requires, however, a proper ontological framework that is capable of establishing the identity of a digital copy consistently over time. After analyzing the challenges involved with the identification of digital copies, this chapter will investigate whether the FRBR framework or the IAO are capable of fulfilling that requirement.

⁶¹⁷ DRM systems are an attempt to control the use and to restrict the access of digital content by the means of specific technological measures of protection that preclude the unauthorized reproduction, distribution or alteration of the particular copy of a work. By enforcing the terms and conditions of the proprietary licenses under which every copy of a work is released, DRM systems basically restrict the way in which the users who already possess a copy of the work are actually able to use. For more details, see *supra* Part I. Chapter 3: Private regulation: Technological measures.

⁶¹⁸ Open Content licenses are copyright licenses that are intended to remove some of the standard restrictions imposed over the exploitation of a work by copyright law. The license is applied directly to a particular copy of the work, which can consequently be freely reproduced and redistributed without requiring the consent of the author. Because the license is incorporated into the copy of the work, every user who receives a copy is automatically granted the same rights as the original owner of the copy. For more details, see *supra* Part I. Chapter 4: Private regulation: Open Content.

DEFINITION OF A COPY

The notion of a copy is a concept that is particularly difficult to define because the term has been adopted indifferent fields of endeavors and often to refer to different things. As such, the concept of a copy does not enjoy a unique and universally accepted definition, as its meaning ultimately depends upon the context in which it is being employed.

In the context of information, the ‘copy’ of a work is an arbitrary notion which does not refer to any concrete entity, but rather to a more general concept that serves the purpose of identifying various instances of the work according to their distinctive attributes and properties. Given that it does not qualify as a physical entity which can be observed in the real world, the function of a copy is essentially to regroup the different instances of a work that can be logically regarded as one single entity under a common framework. As such, however, the scope of a copy cannot be universally established because its identity ultimately depends upon the way in which it has been defined in different fields of knowledge.

Before the provisions of the copyright regime can actually be applied in the context of the digital environment, it has become imperative to provide a precise definition of what constitutes the copy of a digital work. In particular, for the purposes of the copyright regime, a copy is generally regarded as an entity whose function is to allow for a work to be enjoyed, consumed, or otherwise exploited independently of any other instance of the same work. In order to fulfill its function, the copy of a copy must therefore be defined in such a way as to allow for every copy of the work to enjoy an individual ‘identity’ which characterizes it as a particular entity that can be clearly distinguished from any other copy of the same work.

This is particularly relevant in the digital environment, where, in view of the specificities of the digital medium, a new set of principles may need to be employed to establish the identity of a copy. Indeed, in the physical world, the copy of a work has always been associated with the physical medium incorporating a particular instance of the work. With the advent of digital technologies, however, the physical attributes of a work have lost significance to the extent that they refers to an ephemeral entity whose distinctive properties are likely to change over time.

Yet, given that many provisions of copyright law are related to the notion of a ‘copy’, it has become imperative to identify what constitutes the copy of a work in the digital environment. If a digital copy cannot be identified according to its physical characteristics, a different approach has to be implemented in order to properly and consistently identify the copy of a digital work over time.

A. PROPERTIES OF DIGITAL COPIES

The ubiquitous deployment of digital technologies have facilitated the digitization of virtually any type of content and have made it increasingly easy and attractive for content providers to produce information in a digital format. As digital content can be released under a variety of copyright licenses whose terms and

conditions may considerably differ according to the quality and the extent to which the content can be legitimately exploited, digitization has had a considerable impact on the commercial practices of copyright owners who took advantage of the possibility to engage into extensive price discrimination.

At the same time, however, digitization also significantly affected the behavior and the expectations of end-users, as they began to realize that the consumption of information in a digital format is drastically different from the consumption of a physical artifact.⁶¹⁹ In fact, while one of the main advantages of the digital medium is that it basically allows for any piece of information to be communicated in a variety of ways and to be encoded into a format which can be continuously adjusted (as a result of e.g. compression, encryption, conversion, or any other kind of alteration which does not actually affect the content of the work),⁶²⁰ the problem is that the inherent malleability and transferability of digital content is such that the physical representation thereof is likely to be continuously subject to change.

Yet, the particularity of the digital medium, as opposed to the physical medium, is that, even though the format in which the content is being conveyed to the public has become increasingly subject to change, many of the differences that subsist in the physical and/or digital representation thereof do not generally affect the way in which it is being perceived by end-users. Insofar as any digital device is capable of properly understanding and communicating the content in a way that is comprehensible by end-users, there is virtually no difference amongst the different encodings of a digital work, from the perspective of end-users.

To be sure, there is an important distinction to be made with regard to the way in which information is communicated to the public in the physical and in the digital environment. In the physical world, information must be incorporated into a series of material objects or tangible documents whose content is permanent or semi-permanent. Once it has been encapsulated into a particular medium of expression, the content becomes

⁶¹⁹ With the constant development of digital technologies, people are progressively modifying the way they think, they learn and they communicate. Digitization is becoming increasingly popular and as a result of recent technological advances, it is now possible to obtain a digital representation of nearly every medium of expression (texts, videos, sounds, images, etc). The increasing popularity of digital content often results from expectations of various genres, such as increased flexibility, cost reductions, and other kinds of efficiencies. Yet, while the digital medium has the potential to bring a very large number of benefits, these benefits will only be achieved if digital content is managed in a proper and responsible way. For more details, see e.g. SMITH, A. (1999) Why Digitize? *Microform & Imaging Review*, 28, 110-119.

⁶²⁰ Certain formats may be preferable than others in a particular context or for a specific set of circumstances. For instance, different kinds of information may be stored into different formats which have been designed specifically for that particular type of data. Moreover, while certain content may still be acceptable in a compressed form, other content may be encoded into a more advanced format which promises an increased quality and/or functionality in exchange of a corresponding increase in size. Besides, even if a number of formats are considered to be technologically superior to others, digital files may have to be converted into another format because certain digital devices only support a predetermined set of formats. Finally, DRM systems may apply technological protection and insert a particular set of metadata into every digital file they encounter, or they may as well refuse to access files which have not been encoded into a certified format. For a general view of the various attributes that belong to different file formats, see e.g. ARMS, C. R. & FLEISCHHAUER, C. (2003) Digital Formats: Factors for Sustainability, Sustainability, and Quality. *Digital Library Federation Forum*. Albuquerque, New Mexico. While all these formats exhibit particular characteristics of form, they generally do not affect the actual content that is incorporated into the digital file. As such, they should therefore not be regarded as part of the expression of the work.

part of the medium and can no longer be extracted nor modified without any quality loss.⁶²¹ Conversely, digital works are inherently immaterial. Although they require a physical medium in order to exist, they are made of digital bits which can be perfectly reproduced and can frequently change their location as they are transferred from one medium to another.

Yet, once information has been digitized, provided that it is being communicated by means of a similar medium of expression, any piece of content which has been incorporated into a digital medium can be perceived by end-users in the exact same way, regardless of the format in which it is conveyed to the public. From the perspective of the user, therefore, the digital format assumed by any given instance of a work does not always constitute a relevant factor for the purposes of distinguishing one copy of the work from another.

One problem is, however, that the content of a digital work is likely to be more variable than that of a physical work. Indeed, as a result of the malleability of digital media, the content of a digital work can be easily updated, revised, amended, or otherwise modified to create different versions of the work that may ultimately distinguish themselves as a result of only a minimal amount of changes.⁶²² In other words, a digital work is necessarily a work in progress. As opposed to its physical counterpart, whose identity can be determined at the moment in which it is incorporated into a tangible medium of expression, the identity of a digital work is more difficult to establish to the extent that its content is constantly subject to change. For instance, most websites on the Internet belong to that particular category of information entities which do not have a definitive identity, given that their boundaries are continuously evolving as their content is being constantly revised or updated.

The accurate identification of any entity that is susceptible to evolve over time is likely to pose a series of new and interesting challenges. As a general rule, both in the physical and in the digital environment, changes may relate to any aspect of the work - be it the physical representation (as a result of e.g. deterioration), the format and manifestation (as a result of encoding, reformatting, etc), or the actual expression of the work (as a result of revisions or updates). Yet, while the frequency at which changes may occur in a work is much higher in the digital world, the degree of transformation resulting from every change is generally much lower than for most physical works.⁶²³ Besides, as opposed to most traditional works which remain constant over time and only

⁶²¹ In the context of analog recording, the recording is incorporated into the medium so that the medium becomes one with the recording. As opposed to digital media, which can be regarded as mere containers of information, information encapsulated into an analog device cannot be extracted, modified, or duplicated without any quality loss. See e.g. WATKINSON, J. (1993) Sound Storage and Interchange on Physical Media: Making the Most of Computer Technology. *Conference on Digital Audio Interchange*. UK.

⁶²² The technology of digitization had a considerable impact on the way in which information is being conveyed to the public, but also on the way in which information is being produced and maintained. The malleability of digital media allows for information to be edited, revised, adapted, or otherwise manipulated in a completely new way. Through the manipulation of a particular sequence of bits, any digital document can be revised anytime, by anyone and in an indefinite number of ways without actually affecting the original version thereof. See RUTENBECK, J. (2000) The 5 Great Challenges of the Digital Age. *NetConnect*, Fall 2000.

⁶²³ For instance, while the digital edition of a dynamic work such as a Wiki website gets updated every time users submit their own contributions, the physical editions of dynamic works only get updated when a considerable amount of changes have been adopted. For instance, Mirriam-Webster only publishes small revisions of the Webster's Unabridged dictionary each year and larger editions every decades. More details at HILL, B. M. (2003) *Collaborative Literary Creation and Control*.

evolve in order to satisfy particular needs of consumers (e.g. different translations of a work or different editions thereof may be developed in order to meet different demands), most of the works specifically intended to evolve over time are fundamentally dynamic and users are therefore more likely to only be interested in the latest version thereof.⁶²⁴

Accordingly, given that digital copies have different properties than their physical counterparts, there is a fundamental difference between whether a work of authorship has been incorporated into a physical or a digital medium.

Indeed, although the copy of a physical work can usually be reduced to a physical medium of expression, this is not necessarily the case of a digital copy, whose identity exists independently from the physical realm. Even though it can only be experienced through a physical medium, a digital work cannot be considered tantamount to the medium through which it is being conveyed to the public. The physical attributes of the medium are, in fact, irrelevant to the digital work, whose properties are completely separate from that of the physical medium of expression on which it temporarily resides. To the extent that they differ in terms of their essential properties, they must therefore satisfy different criteria to ensure their respective existence and subsistence over time.⁶²⁵

It could be argued that most of the difficulties related to the identification of the copy of a digital work are a result of the fact that the world is essentially made up of physical entities. Most people are used to interacting with physical things and are therefore likely to combine things together into a common framework and describe them according to a similar set of principles - regardless of their nature or type. It is, however, becoming increasingly difficult to apply the standard principles of physical property in the digital environment. In view of their inherent characteristics, digital entities cannot in fact be properly integrated into a scheme of enduring and recurrent physical objects.⁶²⁶

⁶²⁴ With the advent of digital technologies, the content of a document is no longer fixed but is necessarily mutable. While this obviously has a large number of advantages, this may also generate problems to the extent that it becomes difficult to identify one or more documents as being the “same”. Strictly speaking, dynamic updates and revisions always generate a new and distinct digital document, which is however regarded by end-users as being the same document in spite of the diversity in its content. See e.g. BROWN, J. S. & DUGUID, P. (1996) *The Social Life of Documents. First Monday*, 1.

⁶²⁵ As opposed to the physical medium, the existence of a digital work does not depend upon the existence of any physical object. Similarly, the persistence of a digital work is independent from the subsistence of the physical medium on which it has been incorporated, given that it can be transferred from one medium to another without any consequences on its identity. Finally, the essential features of a digital work are completely different from those of the physical medium of expression on which it resides, which is exclusively concerned with the physical properties of the thing. For more details on the problems that may occur when one reduces a cultural object to a mere physical object, see e.g. THOMASSON, A. L. (2005) *Ingarden and the Ontology of Cultural Objects*. IN CHRUDZIMSKI, A. (Ed.) *Existence, Culture, and Persons: The Ontology of Roman Ingarden*. Frankfurt.

⁶²⁶ Physical objects are the most apparent entities that surround us and we are therefore prone to talk and to think in terms of these objects. In order to analyze and to understand any given portion of reality that we are not yet familiar with, we necessarily have to frame it according to a pattern that we already understand. As a result, our perception of reality will be directly affected by the way we perceive the world according to our conventional framework of perception. For more details, see QUINE, W. V. (1969) *Speaking of objects. Ontological Relativity and Other Essays*. Columbia, New York.

As opposed to many physical media, indeed, digital media do not have any predetermined form in the physical world. Just like the information it incorporates, the same digital copy could theoretically be incorporated into an indefinite number of media of completely different nature or form. As such, the copy of a digital work cannot itself be regarded as a physical entity, even though it necessarily resides within a physical resource.

According to Descartes, the world is fundamentally composed of two categories of entities: *res extensa* on the one hand, used to designate the physical world (i.e. information as a physical thing), and *res cogitatae* on the other hand, used to denote the human mind, its thoughts or any mechanism of communication (i.e. information as an intangible thing).⁶²⁷ On the one hand, digital copies could theoretically be regarded as *res extensa* to the extent that they enjoy the same properties as physical entities, such as selfsameness (the quality of being oneself), durability (the capacity to persist over time), and substantiality (the quality of maintaining similar attributes in every circumstances).⁶²⁸ In addition, the copy of a digital work can actually be used like any other physical asset in order to perform an action in the physical world.⁶²⁹ On the other hand, however, digital copies may also be regarded as *res cogitatae* insofar as they are tantamount to an abstract representation of knowledge. Like any intangible asset, in fact, the copies of a digital work do not have any spatio-temporal constraints. They can be duplicated without any loss of information and they may exist simultaneously in many different places.⁶³⁰ In addition, a digital copy can theoretically endure forever without incurring into any kind

⁶²⁷ Descartes believed the world was composed of two basic entities: *res cogitatae* (things that subsist in the mind) which exclusively subsists in the human consciousness, whereas *res extensa* (things that extend in space) which basically includes anything that constitutes the material world. See DESCARTES, R. (1644) *Treatise on Man*, Harvard University Press.

⁶²⁸ Digital entities exhibit certain characteristics which have been commonly associated with tangible entities. Indeed, although confined into the digital environment, digital entities replicate many of the properties that tangible entities display in the physical world. In particular, according to Heidegger, selfsameness (*selbigkeit*) applies whenever it is possible perceive a thing as a particular entity with a consistent set of attributes over time. Information goods may fulfill this criterion, as they enjoy both the property of substantiality, which denotes the fact that a digital item may subsist in the digital world regardless of whether it is being observed or not, and the property of durability, which enable people to interact with a digital item over and over again. For more details, see HEIDEGGER, M. (1992) *History of the Concept of Time*, Bloomington, Indiana, Indiana University Press.

⁶²⁹ When regarded as a tool, digital entities become very similar to physical assets in that they are both capable of having an impact upon the physical world and should therefore both be regarded as a constitutive part of the world. For instance, as computer software regulates the use of a computer, it increases the usability thereof by modifying the range of actions that can be performed with the computer. Similarly, the Internet is an extremely valuable and yet intangible tool which has drastically affected the life of virtually everyone. For more details on how digital entities can actually affect the world around us, see e.g. HEIDEGGER, M. (1988) *The Basic Problems of Phenomenology*, Bloomington, Indiana, Indiana University Press.

⁶³⁰ According to Husserl, everything in the physical world has its own place and temporality. As a result of their corporeal form, the specific location of certain things is determined in relation with the location of other things, and although things can be moved around, they may only exist at one place at a time. See HUSSERL, E. (1973) *Experience and Judgment: Investigations in a Genealogy of Logic*, Evanston, Illinois, Northwestern University Press. This does not apply to the realm of cyberspace. Digital entities do not have their own place or temporality and may therefore exist simultaneously in a variety of different locations. For instance, the content of a website does not only exist on the server on which it has been stored, but also on the computer of every individual user accessing the website. Accordingly, digital entities cannot be regarded as being in any specific location because they can be virtually anywhere in the cyberspace, nor can their temporality be determined because digital entities have no datability. See HEIDEGGER, M. (1988) *The Basic Problems of Phenomenology*, Bloomington, Indiana, Indiana University Press.

of degradation, or it can suddenly disappear without leaving any trace.⁶³¹ In the digital world, therefore, Descartes' distinction between the two categories of information may have become obsolete and the introduction of a third category, *res digitalis*, located somewhere in between *res extensa* and *res cogitatae* may be necessary for the proper classification of digital copies.⁶³²

Because of the specificities of the digital medium and the distinctive properties of digital content, the physical representation of a work can no longer constitute the main criterion of analysis to determine the identity of a copy. Yet, given that a digital copy does not have any physical boundaries, it can be extremely complicated to determine the scope of the various instances thereof. A different set of criteria must therefore be adopted in order to accurately establish the scope of a digital copy.⁶³³

In conclusion, the concept of the 'copy' may ultimately fundamentally according to whether it is being assessed in the physical or in the digital environment. For it to be regarded as an entity with a reliable function and a consistent set of properties over time, the notion of a copy might ultimately have to be interpreted differently according to the context of analysis.

B. THE COPY AS A SOCIAL CONSTRUCT

One fundamental problem with the identification of the copy of a work is that a 'copy' is a concept that does not exist in nature. It is the result of a social construction based upon a common and shared understanding of what can be perceived as a copy.

In the words of Ingarden, the copy of a work is an entity which qualifies as a 'purely intentional object' because both its existence and its identity are ultimately dependent upon human perceptions. Yet, as opposed to an imaginary object, which only and exclusively depends upon the operation of the mind, the copy of a work can

⁶³¹ Digital items can be perfectly and unconditionally duplicated. Since they merely consist of binary digits, there is no quality loss during the process of duplication, so that it becomes impossible to distinguish between the original and the duplicates. See ARENDT, H. (1958) *The Human Condition*, Chicago, Illinois, University of Chicago Press. Besides, digital entities could theoretically subsist eternally without ever being subject to degradation, although they may also instantaneously disappear without leaving any traces as soon as the last instance of a digital item is destroyed.

⁶³² Given the distinctive qualities of digital entities, which exhibit certain properties of *res cogitatae* and certain attributes of *res extensa*, they cannot be properly classified as either of them but should be arranged into the separate category of *res digitalis* which would combine the characteristics of both *res cogitatae* and *res extensa*. For more details, see KIM, J. (2001) Phenomenology of Digital-Being. *Human Studies*, 24, 87-111.

⁶³³ As opposed to the physical environment, where the identity of a copy can be easily determined by means of the physical layer of abstraction, the identity of a digital copy can only be determined by means of a series of identity conditions which establish the criteria that have to be fulfilled in order for any instance of the work to actually qualify as a particular copy thereof. Given that different instances of a work can never be identical on every aspect of analysis, however, the identity of a copy in the digital environment should ultimately be defined in line with the concept of logical equivalence, which provides a mechanism to determine whether two entities should be regarded as the same copy of the work according to whether or not they fulfill the necessary identity conditions. For more details, see RENEAR, A. & DUBIN, D. (2003) Towards Identity Conditions for Digital Documents. *School of Library and Information Science*. Urbana-Champaign, University of Illinois.

only be regarded as a 'derived purely intentional object' - in the sense that its subsistence does not exclusively depends on mental operations but also on other entities such as physical objects.⁶³⁴

In other words, while, in the physical environment, a copy has traditionally been regarded as a tangible entity, in the digital realm, the copy of a work can no longer be associated with any physical object. This is due to the fact that, not only the work, but also the copy itself has become generically (as opposed to specifically) dependent upon a physical entity. Just like the work of art it incorporates, the copy of a digital work is no longer specific to any specific physical object, but is generically dependent upon the subsistence of at least one physical entity to which it actually refers.⁶³⁵ Accordingly, in the physical world, the copy of a work will always and necessarily refer to the same physical entity, whereas, in the digital environment, the entity to which the copy of a work ultimately refers is likely to change over time.

In contrast with the work of art - which may subsist simultaneously in an indefinite number of copies, the copy of a work has traditionally been considered to subsist into no more than one physical entity at a time (c.f. the concept of the copy as a token). In order to remain consistent with the common understanding of the notion of a copy, it is therefore necessary to establish a specific set of criteria so as to be able to precisely determine what constitutes the copy of a work in the digital environment.

As distinctively expressed by Quine, there can be "no entity without identity".⁶³⁶ Logic requires that every entity possess its own and distinctive criteria that stipulate the conditions under which it is possible to say that X and Y are the same entity. Identity criteria for physical objects are generally easier to identify because their identity can often be objectively established according to physical laws. Yet, there is a point in which the boundaries between one entity and another become difficult to discern.

Descartes' famous ball of wax thought experiment appropriately describes the dilemma arising from the inherent difficulty in identifying an entity over time. In the course of his meditations, Descartes analyzes the identity of a piece of wax which is characterized by a particular set of attributes in terms of shape, texture, color, smell, etc. Descartes claims that this particular piece of wax will retain its identity even after it has been brought towards a flame (i.e. after it has been melted or burnt), and will thus be regarded as the same entity in

⁶³⁴ Ingarden distinguishes between 'primary purely intentional objects' and 'derived purely intentional objects' according to whether they depend directly on (and only on) intentional acts of consciousness, or whether the mind-dependence is mediated by other, non-mental entities. See INGARDEN, R. & GRABOWICZ, G. G. (1979) *The Literary Work of Art: An Investigation of the Borderlines of Ontology, Logic, and Theory of Language*, Northwestern University Press.

⁶³⁵ Ingarden recognizes the fact that, even though the work of art is a 'purely intentional object', it can only be publicly accessible when it is incorporated into a material entity. However, Ingarden considers that the work of art is not tied to any external entity because it is only generically dependent on the physical medium through which it is being conveyed to the public. See Ibid.

⁶³⁶ The precept "No entity without identity" illustrates one of the most fundamental requirements in formal ontology which requires the precise identification of identity conditions for every entity that belongs to the taxonomy. According to Quine, admitting certain entities into our vocabulary without precisely defining the identity that characterizes them would necessarily result into a certain disruption of logic. See QUINE, W. V. (1969) *Speaking of objects. Ontological Relativity and Other Essays*. Columbia, New York.

spite of the fact that most of its distinctive attributes have changed.⁶³⁷ From this Descartes concludes that the identity of the piece of wax cannot be expressly determined according to any objective criteria, because it is the result of a mere intuition of the mind. Indeed, if it is not possible to rely on the color, the scent, the shape, the size, the hardness, and the coldness of the wax in order to determine its identity, none of the physical characteristics of the wax can be regarded as an essential property thereof. According to Descartes, therefore, the way we perceive the wax is determined by reason rather than by the power of senses.⁶³⁸

In other words, establishing the identity of any given entity (whether it consists of a material or immaterial entity) ultimately depends upon the way in which this entity is perceived by society. If the point in which a particular entity ceases to exist and eventually becomes a new and separate entity cannot be determined by objective criteria, the subjective perception of every member of society must necessarily be accounted for in order to identify the criteria that should be taken into account in assessing the relationship of equality (or, perhaps, of equivalence) that subsists between one entity and another.

In the context of copyright works, it can be assumed that whether or not an entity should be regarded as the particular copy of a work will ultimately be determined by the function it plays in the mind of consumers rather than as a result of its physical characteristics. In the case of a book, for instance, even after the physical properties of the book have been significantly altered (i.e. because the book has been damaged or otherwise tampered with), the copy will nonetheless retain its identity to the extent that it can still be recognized as such by the reader. Conversely, were the book to assume a completely different form (i.e. as a result of having been burnt or destroyed), it would no longer qualify as the same copy of the work because it could no longer be recognized as such by the reader.

Whether or not the mutations that have been encountered by the particular copy of a work are significant enough to result into the production of a new entity (i.e. a new copy with a new identity of its own) is therefore ultimately a matter of social standards and perception. Although they can generally be regarded as a good indication that the identity of a copy has remained the same over time, the physical attributes of a copy do not necessarily have to persist over time. The mere fact that society continues to perceive it as the same entity

⁶³⁷ Although it may seem that, by virtue of their physicality, material things can be understood better than immaterial things, according to Descartes, this is not necessarily the case. Descartes refutes in fact the idea that physical things can be completely understood by the means of our senses alone. In particular, in his second meditation, Descartes examines a particular piece of wax before and after it has been heated up by the fire. Even if the wax changes form when it melts, it can still be regarded as the same piece of wax. In order to identify the piece of wax as an entity that persist over time, therefore, one cannot exclusively rely upon the physical characteristics thereof (since melted wax has different properties than wax), but should instead refer to the concept of wax as a notion that subsists independently of the physical representation thereof. For more details on Descartes' wax argument, see DESCARTES, R. (1641) *Meditation II: Of the Nature of the Human Mind; and that is more easily known than the Body. Discourses on the Method and the Meditations on First Philosophy*. Hackett Publishing (1999).

⁶³⁸ The essence of a thing is the only thing that is required to persist in order for the thing to retain its identity over time. Whatever property can vary without affecting the identity of the thing it relates to cannot itself constitute the essence of that thing. Accordingly, with regard to the piece of wax, given that its physical characteristics are likely to change over time, they cannot be regarded as the distinctive properties thereof. In the words of Descartes, "when I distinguish the wax from its external forms, as if stripping it of its clothing, and look at it in its nakedness, then [...] I cannot perceive it thus without a human mind [i.e. without reason]). See DESCARTES, R. *Ibid.*

is sufficient for a particular copy of the work to be recognized as being the same in spite of the changes it may have been subject to.

When it comes to establishing the criteria to determine the identity of intangible objects, the situation becomes however more complicated because it is no longer possible to rely on any of the physical properties of an object in order to determine its identity. Just like any other social or cultural object (such as money, churches, or flags, etc), the copy of a digital work is an objective part of the world - in the sense that it necessarily inheres into a physical object - whose identity does not however depend upon any of the physical properties of that object to the extent that it is only generically dependent upon it.⁶³⁹

In the digital realm, therefore, the qualification of an entity as the particular copy of a work ultimately depends upon human perception and social conventions. To determine the identity of a copy presupposes the subsistence of a common conceptual framework that establishes the conditions under which an entity can be perceived by society as the particular copy of a work. Different definitions might therefore be adopted according to the role it plays and the function it assumes in different jurisdictions.

In the context of creative works, such a common framework has been provided by copyright law, whose provisions should therefore be thoroughly investigated in order to identify the criteria which have to be met for any given instance of a work to be regarded as a particular copy of the work. In view of the differences that subsist between the physical and the digital environment, the same notion may in fact need to be interpreted differently from one context to another.

C. THE COPY AS A LEGAL CONCEPT

As a legal concept, the meaning of a 'copy' is to be construed according to the legal system in which it inheres so as to ensure that it remains consistent with all values and principles that pertain to that system.⁶⁴⁰

In particular, the proper understanding of a legal concept requires the acknowledgement of two things: (1) the conditions for its use, i.e. what are the legal preconditions for something to fall within the scope of a particular

⁶³⁹ According to Ingarden, social and cultural objects are the result of a conscious act which is intended to assign a series of intentional properties to a physical entity. They qualify therefore as a social construction on the one hand (in the sense that both their existence and their subsistence ultimately depends upon human perception), but, on the other hand, they also represent an objective part of the world (in the sense that they consist of physical entities that cannot be modified at will). Given that they exhibit the characteristics of both physical objects and purely intentional objects, the identity of social and cultural objects can sometimes be difficult to determine. For more details on the problems related to establishing the identity of social and cultural objects, see e.g. THOMASSON, A. L. (2005) Ingarden and the Ontology of Cultural Objects. IN CHRUDZIMSKI, A. (Ed.) *Existence, Culture, and Persons: The Ontology of Roman Ingarden*. Frankfurt.

⁶⁴⁰ The meaning of a legal concept can be inferred from the provisions of the legal system from which it is being assessed. However, the interpretation of a legal concept also contributes to the overall structure of the legal system, insofar as it determines the extent to which the legal provisions associated with that concept will apply. The meaning of any legal concept will therefore be determined according to what is believed to lead to the most appropriate legal consequences. See SARTOR, G. (2009) The Nature of Legal Concepts: Inferential Nodes and Ontological Categories. *Artificial Intelligence and Law*, 17.

concept, and (2) the consequences of its use, i.e. what are the legal conclusions that can be derived from the fact that something actually qualifies as a particular concept.⁶⁴¹ For the sake of legal consistency, while the latter should always remain the same regardless of the context of analysis, the former may vary according to the characteristics of the system taken into consideration.

The reason is that the definition of most legal concepts is generally determined by the legal system to which they refer. As a matter of fact, every legal provision of a particular legal system contributes to defining the meaning of a particular legal concept - to the extent that it determines either the preconditions for its existence or the legal consequences of its subsistence. Accordingly, given that different legal systems are likely to feature different legal provisions, they will necessarily assume different definitions for the same legal concept.⁶⁴²

An analogous situation may also occur within the framework of one single legal system - to the extent that it features different provisions that may or may not apply to a particular concept according to the context of analysis. The result is a legal regime in which a different set of provisions may refer to the same legal concept depending upon the circumstances or the context that is taken into account (e.g. the physical environment vs. the digital environment).

This is the case of the copyright regime, which associates a different set of provisions to the notion of a 'copy', according to whether they refer to the copy of a physical or a digital work. For instance, in various jurisdictions, the doctrine of exhaustion has been expressly held not to apply to digital copies.⁶⁴³ In addition, as a result of recent legislative reforms, the regime of copyright limitations and exemptions has been implemented differently with regard to the physical and the digital environment,⁶⁴⁴ where, for example, the exemption of 'private copy' has progressively lost its significance.⁶⁴⁵

⁶⁴¹ According to Dummett, two things are required before one can learn to use a statement: (1) the conditions under which one is justified in making the statement, and (2) the consequences that can be derived from the accepting the statement as true. For more details, see DUMMETT, M. (1973) *Frege's Philosophy of Language*, New York, NY, Harper and Row.

⁶⁴² It is often the case that a particular legal concept which can be found in many different jurisdictions does not feature a consistent and uniform definition. For instance, although the concept of a 'contract' is present in virtually every legal system, its meaning may vary according to the jurisdiction that is taken into account to the extent that the rules governing contracts are not necessarily nor entirely interchangeable from one jurisdiction to another. For a more detailed overview of the divergences that can be found in the definition of legal concepts across different legal systems, see e.g. AJANI, G. & EBERS, M. (2005) *Uniform terminology for European contract law*, Baden-Baden: Nomos.

⁶⁴³ See e.g. the WIPO Copyright Treaty, Agreed statements concerning Articles 6 and 7: "As used in these Articles, the expressions "copies" and "original and copies" being subject to the right of distribution [...] refer exclusively to fixed copies that can be put into circulation as tangible objects." See also the preamble 29 of the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society, according to which the doctrine of exhaustion shall not apply to the provisions of services and online services in particular, as well as the US Copyright Office Report on the DMCA Section 104 concerning the non-implementation of the digital first sale doctrine.

⁶⁴⁴ In its preamble, the WIPO Copyright Treaty expressly recognizes the "need to maintain a balance between the rights of authors and the larger public interest". On the one hand, while it incorporates the three-step test of the Berne Convention, the Treaty also specifies that every contracting party has the right to implement new exemptions and limitations specific to the digital environment (see, in particular, the Agreed Statement to Article 10 of the WCT). On the other hand, however, different regimes of exemptions have been introduced with regard to technologically protected copyright works (see WIPO Copyright Treaty, article 10 and WIPO

If we consider that the provisions of the legal system actually contribute to defining the terms they refer to, we may end up into a situation in which the same legal concept (in this case, the notion of a ‘copy’) would assume a different meaning in the digital world than it does in the physical world.

The problem is that the copyright regime does not provide any explicit definition of either a ‘physical copy’ or a ‘digital copy’. Accordingly, unless its identity can be defined according to an objective set of criteria, different interpretations may eventually result in the implementation of different legal regimes which may ultimately favor certain categories of stakeholders over the others.

In particular, in view of the fact that many provisions of the copyright regime and most of the terms and conditions of end-user licensing agreements are fundamentally based upon the notion of a ‘copy’, the effective enforcement of the law ultimately depends upon the interpretation that has been assigned to that notion in the various contexts of analysis. Yet, if the goal is to preserve the same substantive rights as those that exist in the physical environment, the provisions of the copyright regime should not be applied literally into the digital environment, but should rather be interpreted according to the function that they are intended to achieve.⁶⁴⁶

Performances and Phonograms Treaty, article 16); as implemented in the European Community by the Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society article 5, which proposes one mandatory exemption together with a list of optional limitations that the member states can implement in their national legislation, subject to the qualification of article 6(4) according to which no measures needs to be taken to ensure that the exemptions are made available to the users whenever voluntary measures such as private agreements have been undertaken between right holders and the other parties concerned; and as implemented in the United States by the DMCA section 1201(d) to 1201(i), which establishes a regime of limitations much less flexible than the system resulting from the application of the fair use doctrine of the US Copyright Act of 1976, 17 U.S.C. § 107.

⁶⁴⁵ In order to balance the interests of end-users with that of the copyright owners, most jurisdictions recognize the right to a private copy as a limitation to the exclusive right of reproduction granted to the copyright owners. For instance, even though they may not explicitly acknowledge the right to private copying, many countries of the EU have implemented a particular levy system intended to establish a liability regime that would allow for the making of private copies while simultaneously compensating right holders with an equitable remuneration. However, as copyright law has been reformed for the digital environment, the right to a private copy might be considerably diminished. In Europe, the European Directive 2001/29/EC on the harmonization of certain aspects of copyright and related rights in the information society (EUCD) has acknowledged private copying as an optional exception, which may (but does not necessarily has to) be implemented within the national legislation of members States. Moreover, both in Europe and in the US, recent legislative reforms have considerably restrained the possibilities for private copying in the digital environment as a result of the more limited regime of limitations/fair use that has been made available to technologically protected works (see, in particular, Article 5 and Article 6 of the EUCD, and section 1201 of the Digital Copyright Millennium Act of 1996).

⁶⁴⁶ In order to be applicable to the digital environment, copyright law needs to be reformed. Yet, the provisions of the copyright regime as it applies to the physical environment cannot be literally translated into the digital environment without taking into account the specificities of the Internet and digital technologies, because there is otherwise a risk that the scope of the copyright would become much broader. See e.g. ELKIN-KOREN, N. (1995) Copyright Law and Social Dialogue in the Information Superhighway. *Cardozo Arts & Entertainment Law Journal*, 13.; LITMAN, J. (1994) The Exclusive Right to Read. *Cardozo Arts & Entertainment Law Journal*, 13.; NIMMER, D. (1996) Brains and other Paraphernalia of the Digital Age. *Harvard Journal of Law & Technology*, 10.

Rather than relying upon an inferential approach, it may be more convenient to adopt an ontological approach in order to define the concept of a ‘copy’ according to a more structured and analytical schema.⁶⁴⁷ In other words, instead of interpreting the meaning of a ‘copy’ according to the legal provisions that it has been associated with (i.e. the inferential approach), the term could be defined in such a way as to assume an identity of its own, which could then be employed to identify the proper interpretation of any legal provision that refers to that term (i.e. the ontological approach).

In this respect, as opposed to the physical world, where the identification of the various instances of a work is directly related to the physical characteristics thereof, in the digital environment, the identification of any given copy should ultimately depend upon the interpretation of its function and should therefore be fundamentally subjective and socially constructed. As a social construct, in fact, the definition of a copy cannot be established without accounting for the function that it has been assigned under the copyright regime and for the role it may assume in the mind of both right holders and consumers.

In particular, such a functional approach is necessary to identify the copy of a digital work for the purposes of the copyright regime. This is especially important because, in the framework of copyright law, the identity of a copy basically determines what may or may not be legitimately done to the particular instance of a work which has been licensed to end-users. For instance, in the context of the licensing of rights, the function of a ‘copy’ is to identify the object of the rights granted under an end-user licensing agreement. Consequently, the copy of a work should be defined in such a way as to make it possible for every single instance of the work to be identified as a separate entity with an identity of its own, and for it to be distinguished from any other instance of the same work whenever there is a reason to do so.⁶⁴⁸

In brief, even though the meaning of many legal concepts is likely to evolve over time, and in spite of the fact that their interpretation may differ according to the context of analysis, an ontological approach based on the explicit definition of the concept of a ‘copy’ is likely to provide a better understanding of the copyright system to which it refers. Indeed, although the meaning of any legal concept ultimately depends upon the way in which it has been defined within a particular legal system, an ontological definition of the concept could nonetheless provide a valuable contribution insofar as it would allow for a more accurate representation of the copyright regime both in the physical and in the digital world.⁶⁴⁹

⁶⁴⁷ Legal concepts can be regarded either as (a) inferentially defined concepts, whose meanings can only be abstracted from inferential connections between sentences, or (b) ontologically defined terms, whose meanings have been preliminarily defined and consequently inhere into each concept independently of the context in which they are employed. For more details on the distinction between inferentially defined concepts and ontologically defined terms, see SARTOR, G. (2009) *The Nature of Legal Concepts: Inferential Nodes and Ontological Categories*. *Artificial Intelligence and Law*, 17.

⁶⁴⁸ The scope of a Work can theoretically be described in an indefinite number of ways. For the purpose of identification, however, the most appropriate definition should be the one allowing for every instance of the Work to be regarded as belonging to the same entity, except where it would be more beneficial to distinguish it from another entity on the grounds of their dissimilarities. This is related to the <index> principle of functional granularity, according to which “it should be possible to identify an entity whenever it needs to be distinguished.” See PASKIN, N. (2006) *DOI Handbook*. International DOI Foundation.

⁶⁴⁹ While it may not be sufficient as such to determine the proper meaning of a legal concept, the representation of legal knowledge within an organized taxonomy is useful for the purposes of: (1) categorization, (2) learning, (3) memory, (4) inference, (5)

D. PRELIMINARY DEFINITION OF A DIGITAL COPY

In order to provide a proper representation of the copyright regime from an ontological standpoint, one of the key problems to be addressed is whether it is practical to replicate the traditional notion of a “copy” in the digital environment, or whether an alternative definition should instead be assigned to that term. More precisely, the question is whether it still makes sense to regulate digital content according to technologically outdated principles of physical property in a world in which many things are, nowadays, completely and inherently intangible.⁶⁵⁰

As a matter of fact, the copy of a digital work is an entity characterized by a series of properties that considerably differ from the distinctive properties of a physical copy. The concept of a copy as it was commonly understood in the physical world might therefore no longer be found in the digital world. Even though, in the mind of most users, the copy has always been regarded as a token - i.e. the particular instance of a work which is not capable of multiple instantiations, in the digital world, the concept of a token may be forever gone.⁶⁵¹ By virtue of its intangibility, the copy of a digital work can be instantiated into a variety of different devices, and can therefore no longer be associated to any physical medium. As such, a digital copy no longer qualifies as a ‘token’ but rather as a ‘type’ capable of multiple instantiations.⁶⁵²

explanation, (6) problem solving, (7) generalization, and (8) analogical inference. See, in general, THAGARD, P. (1992) *Conceptual Revolutions*, Princeton, NJ, Princeton University Press. ; whose analysis has been applied by analogy to the legal domain in SARTOR, G. (2009) The Nature of Legal Concepts: Inferential Nodes and Ontological Categories. *Artificial Intelligence and Law*, 17.

⁶⁵⁰ As the name indicates, the very focus of the copyright regime resides in the “copy”. This emphasis on the copy is however the product of the particular characteristics of the physical world. The tangible copies of a work are easily identifiable because of their physical attributes and constitute as such the basic means of consuming a work. In the physical world, copies can therefore be regarded as an accurate proxy for use, whereas, in the digital environment, not only are the copies of a work extremely difficult to identify, but they also no longer serve as an appropriate proxy for use. See e.g. LIU, J. P. (2001) Owning Digital Copies: Copyright law and the Incidents of Copy Ownership. *William and Mary Law Review*, 32. According to some scholars, the various legislative reforms that copyright law has been subject to are fundamentally an improper attempt to confine a new environment into an older and technologically outdated model. See, in particular, LITMAN, J. (1996a) Revising Copyright Law for the Information Age. *Oregon Law Review*, 45, 19-31. and ELKIN-KOREN, N. (1995) Copyright Law and Social Dialogue in the Information Superhighway. *Cardozo Arts & Entertainment Law Journal*, 13. which recognizes the problem that the notion of ‘copy’ in a digitized environment may induce the implementation of a regime for digital work based on regulating the creation of copies rather than addressing the issues of access and use.

⁶⁵¹ With the advent of digital technologies, and in particular as a result of the process of digitization, all information can be encoded into a digital sequence of bits. Since digital data no longer rely on any specific form of storage, the notion of a token has vanished. All information which could once only be conveyed by the means of a physical container (i.e. the token) can now travel through the Internet network regardless of the medium of expression. The temporary physical representation any particular sequence of bits has consequently lost the meaning that had been assigned to the notion of an item. See e.g. BARLOW, J. P. (1992) Selling Wine Without Bottles. *Exposure: From Friction to Freedom*. Helsinki, Finland, Aula.

⁶⁵² Even though, as opposed to a physical copy, the copy of a digital work ultimately qualifies as a type, it does not qualify as a universal type (i.e. as a type that exists in reality regardless of human intervention), but rather as a GDC that can be instantiated into several physical entities (i.e. a defined class).

For the purposes of the copyright regime, provided that different physical embodiments of a work actually qualify as an instance of the same copy, the exploitation thereof should be subject to the very same set of rights and obligations. The problem is that, without a proper object of analysis, it becomes difficult to determine the object of the rights granted under any end-user licensing agreement. In fact, while the scope of the copyright license is generally determined by the physical boundaries of the item to which it refers, in the digital world, it is no longer possible to rely upon the physical attributes of the item in order to determine the scope of the copy. If a digital copy cannot be identified on the basis of its physical properties, it becomes therefore necessary to identify an alternative mechanism that can be relied upon in order to objectively determine the identity of a copy in the digital environment.

1. THE NATURE OF A DIGITAL COPY

To begin with, a distinction should be drawn between the concept of a ‘type’ and the notion of a ‘token’.⁶⁵³ Specifically, types are universal entities which refer to a generic class of entities capable of multiple instantiations, whereas tokens essentially refer to the physical entities into which a type has been instantiated. As a general rule, therefore, types cannot be identified in the physical world if not by way of their physical representation into a particular token.⁶⁵⁴

This distinction may provide a valuable basis of analysis for establishing equivalence between the constitutive elements of a work which are of the same type. Every constitutive element can in fact be regarded as a type, with the exception of the item which may only qualify as a token. More precisely, in view of their intangible character, the work as a general concept, the expression and the manifestation thereof ultimately qualify as a series of types⁶⁵⁵ which are capable of multiple instantiations⁶⁵⁶ - whereas the physical representation of the

⁶⁵³ The distinction between types and tokens has been initially established by Charles Sanders Peirce in his theory of signs. See PEIRCE, C. S. (1906) *Prolegomena to an Apology for Pragmatism*. *The Monist*, 16. The terminology has subsequently been introduced in the field of aesthetics by Richard Wollheim, who distinguished the works of art (types) from their physical representation (tokens). See WOLLHEIM, R. (1968) *Art and its objects*, Cambridge University Press.

⁶⁵⁴ Plato distinguishes between universals, regarded as a general and abstract entity, and particulars, regarded as a definite and concrete entity. Universal exists in the real world but cannot be observed as such. They are however perceived by the means of particulars, which essentially provide a concrete representation of universals in the physical world. Similarly, according to Aristotle, a universal entity is whatever is held in common amongst a given set of particulars. Universals can therefore be instantiated by an indefinite number of particulars which contribute to defining the limits thereof. Accordingly, the definition of a universal entity is not static but essentially varies according to the number of particulars that specifically relate to it. For a more general overview of the distinction between universals and particulars, see SMITH, B. (2004) *Beyond Concepts: Ontology as Reality Representation*. For an analysis of these two concepts as they apply to copyrighted works, see HICK, D. H. (2008) *The Metaphysics and Ethics of Copyright*. *Department of Philosophy*. University of Maryland.

⁶⁵⁵ Both the expression and the manifestation of a work are abstract entities which possess a particular set of properties that distinguishes them from any other expression or manifestation of the same work. As such, they can therefore be regarded as some kind of template which provides the conditions necessary for instantiating a token of that particular type. Accordingly, to the extent that their conditions are satisfied and their distinctive properties are present, the particular expression of a work will maintain its identity regardless of the form in which it is represented, and, similarly, the particular manifestation of that expression will subsist notwithstanding the fact that the physical characteristics of the items into which it has been instantiated may vary. See e.g.

work necessarily qualifies as a token.⁶⁵⁷ Accordingly, to the extent that different works can be regarded as different types, different copies of the same work ultimately qualify as different tokens of the same type.

With regard to the consumption of works, insofar as the provisions of most end-user licensing agreements are specific to one particular copy of the work, a mechanism must be established for end-users to determine whether or not a particular instance of the work can be regarded as an actual instance of that copy. Although relatively straightforward in the physical environment, where the copy of a work is capable of only one instantiation, this operation is likely to be more complex in the digital world. Indeed, as opposed to the physical world, where the notion of a copy is ultimately associated to the concept of a 'token', the concept of a digital copy can be regarded as a particular 'type' which is capable of multiple instantiations.

By virtue of their intangible character, digital copies can subsist in a variety of items that do not have to be physically identical as long as they can be logically identified as belonging to the same type. In other words, different instances of a work might be regarded as the same copy of the work in spite of the differences they display in their physical and/or digital representation. As such, the identity of a digital copy cannot however be determined by the distinctive properties of only one instance of the work. Instead, digital copies should be defined according to that specific set of attributes which they all have in common.

In order to better understand the difference that subsists between a physical copy and a digital copy, it might be useful to rely upon a linguistic artifact that is characteristic of the English language. In ordinary language, it is common practice to refer to a particular entity differently according to the level of details that needs to be taken into account. For instance, as opposed to mass nouns (e.g. money, water, bread, etc) whose quantity cannot be assessed if not by referring to a particular portion thereof (e.g. a liter of water, a portion of bread, etc), count nouns refer instead to individual entities which can be separately counted and evaluated (e.g. coins, water drops, grains, etc). Certain words can however be employed both as count nouns and as mass nouns according to the context of analysis – e.g. 'Fire burns' vs. 'There is a fire in the forest'.

Such a lexical distinction could be used by analogy in order to distinguish between the two meanings assumed by the notions of a 'copy' in the physical and the digital environment. While, on the one hand, the 'copy' of a physical work can be regarded as a concrete entity that incorporates a particular piece of information (count noun), on the other hand, the 'copy' of a digital work can be regarded as a generic entity (i.e. as a class or a set) that cannot be precisely quantified in the real world (mass noun). According to the former definition,

CARROLL, N. (1997) The Ontology of Mass Art. *Journal of Aesthetics and Art Criticism*, 55, CARROLL, N. (1998) *A Philosophy of Mass Art*, Oxford University Press.

⁶⁵⁶ Both a digital document and a digital file can be represented by an indefinite number of tokens. In fact, both may be regarded as a very specific type of template which precisely describes the properties that any given token must assume in order to qualify as a token of a certain type. Yet, neither a digital document nor a digital file can be experienced as such because they do not possess the necessary physical properties of a token. They can therefore only qualify as a type.

⁶⁵⁷ As an abstract entity, a work (type) cannot be experienced unless it has been instantiated into a physical item (token). There exists therefore a relationship of mutual dependency between types and tokens, in that they cannot exist independently of each other: a type cannot be experienced without a token, and, conversely, a token cannot subsist without a type. See MARGOLIS, J. (1977) The Ontological Peculiarity of Works of Art. *Journal of Aesthetics and Art Criticism*, 36, 45-46.

different instances of a work necessarily qualify as different copies of the work by reason of the difference in their physical characteristics. The problem with this definition is that it is however too rigid to be applied in the digital world, given that the physical attributes of any digital work are likely to change over time. In the digital environment, therefore, the latter definition is likely to be preferable. While its scope cannot be numerically quantified – because it is likely to vary whenever new instances of the copy are being produced or destroyed – it can however be qualitatively identified by means of a series of characteristics that contribute to the identity of the digital copy.

In contrast to the concept of the copy as a ‘token’, the notion of the copy as a ‘type’ provides a greater level of flexibility with regard to the identification and the consumption of digital works. In particular, to the extent that it can be regarded as a type, different users could enjoy different rights over the same digital copy in the same way they can enjoy different rights over the same expression of a work. In addition, in order to consume the copy of the work that they have previously acquired, end-users would no longer be limited to only one instance of the work, but would instead be able to rely upon a multitude of digital files - regardless of their actual form or location - provided that they each qualify as a particular instance of the same copy.

In certain circumstances, however, differences in the actual representation of a work may potentially affect the identity of a particular copy thereof. In order to provide an accurate definition of what constitutes the copy of a digital work, it is therefore necessary to determine the type and the amount of changes that may be inflicted to the instance of a digital work without incurring the risk of altering its identity as a copy. Indeed, to the extent that the copy of a digital work qualifies as a ‘type’, the scope of a digital copy can only be established by identifying the maximum degree of discrepancy that can be permitted before a new ‘type’ has to be acknowledged.

2. LOGICAL EQUIVALENCE

Most of the difficulties in determining the identity of a digital work can be resolved through the concept of logical equivalence - which basically distinguishes itself from the concept of material equivalence in that it does not account for the physical representation of a work but mainly concentrates on its distinctive characteristics.⁶⁵⁸ As opposed to material equivalence, which essentially defines a relationship between two or more entities that cannot be distinguished from each other, logical equivalence subsists whenever different entities convey the same logical content regardless of the form in which it is being expressed.

As a universal type, a work can be incorporated into an indefinite number of instances which may distinguish themselves from each other on the basis of their distinctive characteristics, but which are nonetheless related to each other insofar as they refer to the same type. Yet, to the extent that they feature a sufficient degree of commonality, these entities could nevertheless be regarded as being equivalent to each other on a particular

⁶⁵⁸ For the purpose of this work, logical and material equivalence are said to assume a different meaning than that which is generally associated to those terms in the fields of logic or mathematics, as described in e.g. MOURANT, J. A. (1963) *Formal logic*, Macmillan. In particular, for the purpose of this work, logical equivalence is defined as a relationship between two entities which can be mutually inferred from each other in accordance with logical rules (i.e. A can be defined in terms of B and B can be defined in terms of A).

layer of abstraction. The rules employed to determine whether two entities are equivalent to each other are likely to vary according to the specific elements that are being assessed.

While the principle of logical equivalence can be applied to every aspect of the work, in order to establish equivalence at the level of the digital copy, the criteria that must be taken into account are likely to differ from those that would have otherwise been accounted for, if equivalence were to be assessed at the level of the physical item.

In particular, it is important to make a distinction between rigid properties on the one hand, which constitute the most inherent and essential properties of an object, and non-rigid properties on the other hand, which essentially represent the contingent properties of an object. Rigid properties directly contribute to defining the things they relate to; they consist of all those attributes which are necessary for a thing to qualify as itself and which can therefore neither be lost nor changed as long as the thing continues to exist (e.g. the attribute of being a person). Non-rigid properties are instead the result of contingent circumstances and are therefore likely to change over time without affecting the identity of the things they relate to (e.g. the attribute of being a student).⁶⁵⁹ Accordingly, even if they do not exhibit an identical set of non-rigid properties over time, certain entities could nevertheless retain their identity over time as long as they maintain all of their rigid properties intact.

Although, in the tangible world, the physical attributes of an entity are generally considered to be regarded as the most critical properties, in the digital environment, the physical characteristics of a digital entity are considerably less important and are thus more likely to qualify as non-rigid properties. If the principle of logical equivalence can provide some valuable insights for the purposes of establishing what constitutes the copy of a work in the digital environment, it is likely to result in the necessary concession that a particular copy of the work may be considered the same even when its physical representation has changed.⁶⁶⁰

From this premise, the challenge is to determine the criteria that must be taken into account in order to establish the identity of a copy in the digital environment.

⁶⁵⁹ The distinction between a rigid and a non-rigid property can be clearly illustrated with the properties of being a person and being a student. In fact, the 'person' property is normally regarded as rigid: "if x is an instance of 'person' it must be an instance of 'person' in every possible world. The 'student' property on the other hand, is normally not rigid: we can easily imagine an entity moving in and out of the 'student' property while being the same individual." See GUARINO, N. & WELTY, C. A. (2000) A formal ontology of properties. *Proceedings of the 12th European Workshop on Knowledge Acquisition, Modeling and Management*. Springer-Verlag.

⁶⁶⁰ The copy of a work should be described in terms of its function rather than its physical format. In view of the flexible nature of digital documents, it is impossible to identify a copy according to its physical characteristics. Likewise, because digital documents are likely to evolve over time, they cannot either be identified according to their digital manifestation of bits. Instead, digital documents could be identified according to their function or their purpose. Regardless of their physical location, a dynamic document could therefore be recognized as one single document as long as it maintains the same purpose: e.g. although a web blog may be moved from one web server to another and may feature a increasing number of entries, it should always be identified as the same blog. For a more detailed overview of the problems related to the identification of digital documents, see BUCKLAND, M. (1997) What is a digital document? *Journal of the American Society for Information Science*, 48, 804-809.

3. THE SCOPE OF A DIGITAL COPY

Regardless of the way in which it has been defined, the extent to which every copy of a work can be legitimately exploited ultimately depends upon the terms and conditions of the end-user licensing agreement under which it has been released.

Even though the copyright regime does not provide any kind of protection to every aspect of the work, the exploitation thereof may, nonetheless, be restricted by the mere fact that it incorporates another component of the work that itself qualifies for copyright protection. For instance, in the physical world, although an item is not actually eligible for protection, it is nevertheless subject to the provisions of the copyright regime insofar as it incorporates the expression of an original work of authorship. Anyone willing to exploit that particular item of the work must therefore acquire the right to do so by means of a particular licensing agreement. By analogy, in the digital world, a digital file can only be exploited to the extent that doing so would not infringe the copyright vesting in the expression of the work it embodies. Any user willing to exploit a digital file (or any other entity into which it has been incorporated) will therefore have to comply with the terms and conditions of the license it has actually been granted with.

Yet, given that the concept of a digital copy fundamentally differs from the concept of a physical copy, the object of most end-user licensing agreements is also likely to differ according to whether the license refers to a work in a physical or in a digital format. Specifically, in the digital environment, anyone willing to access or to consume a digital work is no longer expected to purchase a particular item of the work but is instead supposed to acquire the right to a digital copy encapsulating the work. By doing so, users acquire the right to consume a particular copy of the work according to the terms and conditions of the copyright license. The license, however, does not refer to any physical instance of the work, but rather to the digital copy as an abstract entity that subsists independently of the physical medium into which it has been incorporated.⁶⁶¹ While, in the physical world, the terms and conditions of a copyright license ultimately apply to one particular item of the work, in the digital world, instead, to the extent that every digital copy is capable of multiple instantiations, the scope of the copyright license must necessarily extend to any instance of the work that can be regarded as a particular copy thereof.

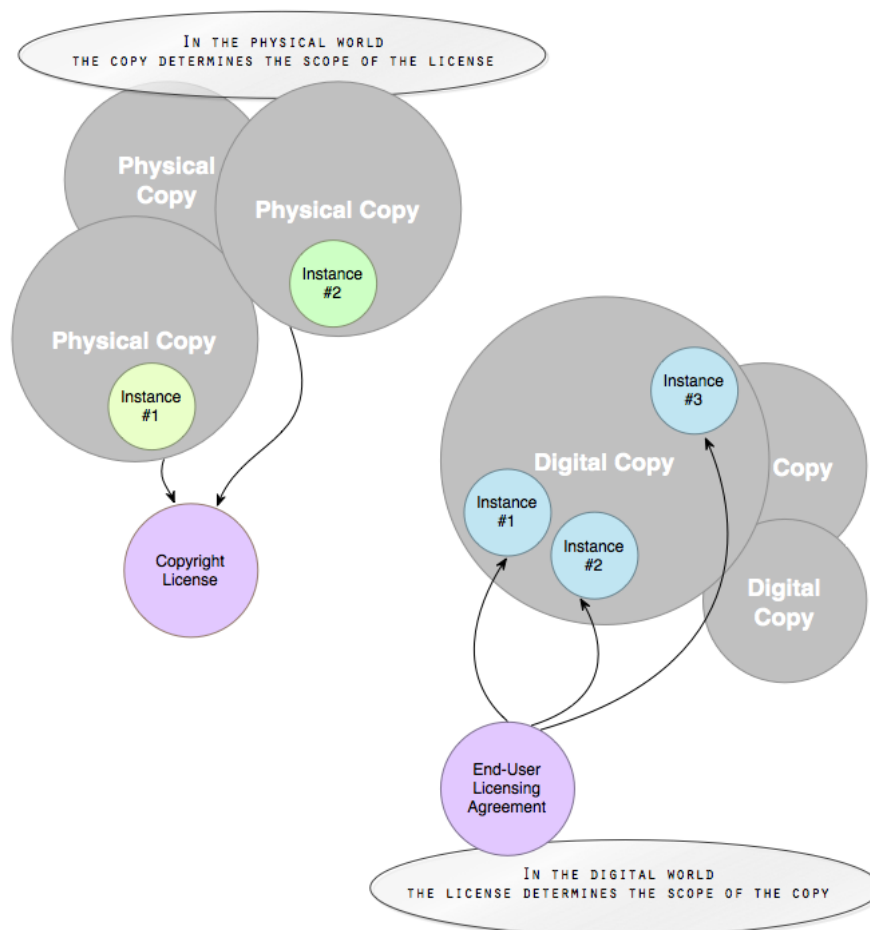
Establishing the scope of a digital copy is therefore necessary to determine the extent to which the various terms and conditions of the copyright license are likely to affect the consumption of different instances of a work. Yet, in the digital environment, given that the copy does not have any physical *corpus*, it is difficult to provide an objective definition of its scope. Unless the scope of a digital copy can be properly identified, the scope of any end-user licensing agreement cannot be properly established.

⁶⁶¹ As opposed to the item which may only consist of one physical entity, a digital document can be embodied into an indefinite number of physical and/or digital entities. Once a user has purchased the right to a given digital document, therefore, that user will be granted with the right to consume any possible instantiation of that Work, regardless of its physical and/or digital representation, as long as that it has been encapsulated into an identical digital document. Under this particular scheme, in fact, given that the identification of a digital Work is based on a higher layer of abstraction, two instantiations of the very same digital document will be regarded as one single entity for the purpose of the copyright regime. Accordingly, just like anyone who is willing to exploit a Work commercially has to acquire the rights in the expression of the work, anyone willing to consume a digital Work will have to acquire the rights in the digital document.

One of the main contributions of this research is to provide a solution to identify the scope of a copy in the digital environment. The idea is to rely upon the interdependence that subsists between the copy of a work and the provisions of the copyright license under which that copy has been released. Indeed, if the range of application of the copyright license cannot be determined by the physical boundaries of the copy to which it refers, the alternative is to regard the provisions of the copyright license as one of the primary factors for determining the scope of a copy. In other words, while, in the physical world, the scope of any licensing agreement concerned with the exploitation of a particular copy of the work fundamentally depends upon the physical boundaries of that copy, in the digital world, instead, the specific terms and conditions of the licensing agreement are what actually determine the scope of the digital copy to which the license refers.

In the digital environment, the owner of the copyright in a work is therefore able to determine the scope of every digital copy by the mere fact of adjusting the range of application of the copyright license under which that particular copy of the work has been released. Different instances of a work could, in fact, be regarded as the same copy of the work insofar as they fulfill all the necessary criteria established by the copyright owner at the moment in which the copy has been released to the public. Accordingly, while the scope of a physical copy is determined by the physical boundaries of the medium into which it inheres, in the digital world, the copyright owner can modify the scope of a digital copy by increasing or diminishing the number of restrictions that have been incorporated into the copyright license.⁶⁶²

⁶⁶² Since there is objective definition of what constitutes a copy in the digital environment, it could be said, basically, that the concept of a digital copy is ultimately determined by the definition given to the digital entity. Yet, the identity of any digital entity is fundamentally determined by the various criteria which have been established by the copyright owner at the moment in which the first instance was made. By varying the level of flexibility and the severity of these criteria, the copyright owner can therefore decide to what extent to which various digital resources with different properties and attributes could actually be regarded as belonging to the same class and as such qualify as the same copy of the work.



The relationship that subsists between the copy of a work and the copyright license under which it has been released is therefore likely to vary according to the context of analysis. As opposed to the physical world, where the scope of application of any end-user licensing agreement is determined by the physical boundaries of the copy to which the license refers, in the digital environment, instead, it is the licensing agreement that actually determines the scope of the copy.

Before the practicality of this approach can be properly assessed, it is necessary to determine whether such a definition of a digital copy can actually be implemented into the ontological framework of either the FRBR or the IAO.

DIGITAL COPIES IN THE FRBR

According to the traditional FRBR framework, the item is the entity that constitutes the copy of a work. In the digital environment, however, this conception of the copy as a token may give rise to a series of problems with regard to the overall consumption of digital works.

In the digital world, in fact, the item of a work is intrinsically transient and ephemeral. Hence, if users were only granted the right to exploit one particular item of the work, their rights would be automatically exhausted as soon as the physical representation of the work would change (e.g. as a result of the item being moved from one medium to another). In view of the inherent difficulties related to the identification of a digital work based upon the identification of the item into which it has been incorporated, the notion of what constitutes the copy of a work may therefore need to be revised in order to be made more compatible with the common expectations of users.

This section purports to investigate whether, in its current implementation, the FRBR framework is able to identify the copies of a digital work, and how it could potentially be adjusted in order to better account for the specificities of the digital environment.

To begin with, it is questionable whether the object of most end-user licensing agreements should remain in the item (i.e. the token), or, alternatively, whether the focus of the license should shift towards a particular ‘type’ (i.e. the work, the expression, or the manifestation thereof). While the former would necessarily rely upon the physical properties of the item, the latter would allow users to determine whether any given item is subject to a particular license according to whether or not it can be regarded as the particular instantiation of a type – and is therefore likely to be the most preferred alternative in the digital environment.⁶⁶³

Indeed, as the item is no longer able to consistently identify a copy over time, it can no longer be relied upon to identify the object of the rights granted under an end-user licensing agreement. As opposed to the physical world, therefore, a different layer of abstraction should be taken into account in order to identify the copy of a work in the digital environment.

Before the identity of a digital copy can be established, it is therefore necessary to identify the layer that would constitute the most appropriate basis of analysis for distinguishing one instance of the work from another. The role of that particular layer of abstraction would be to replace the function that has been traditionally assumed

⁶⁶³ The concept of an item has been dramatically challenged by the advent of digital technologies. Because of the inherently variable and erratic nature of digital resources, identifying an item according to its physical form has in fact become problematic in the digital environment. In particular, focusing exclusively on the physical characteristics of an item may actually displace the original function of the item as an entity in its own right. In the digital world, therefore, the item of a Work should rather be identified in a manner that is independent of the carrier. For a general overview of the problems connected with the identification of a Work based on the physical characteristics of its carrier, see e.g. HOWARTH, L. C. (1997) Content versus Carrier. *International Conference on the Principles and Future Development of AACR*. Toronto, Canada.

by the `item_t` in the physical environment. As such, it would be responsible for identifying the actual object of consumption that is transferred to end-users whenever they acquire a digital work, as well as to delineate the entity that is ultimately associated with the rights and obligations granted under a copyright license.

SECTION 1

DIFFERENT LAYERS OF ABSTRACTION

The main problem with the FRBR is that, insofar as it has been conceived and specifically designed for the physical world, the standard set of entities it provides are incapable of consistently identifying the instance of a digital work over time, given the changes it may incur in terms of its physical or digital representation. Even though the structure of the FRBR framework is sufficiently generic to describe the various aspects of a work, both in the physical and in the digital realm, it might not be detailed enough to describe the characteristics of digital work at lower levels of abstraction. In particular, the definition assigned to the `item_t` is so strongly connected to the physical representation of a work that it can no longer be relied upon to perform the function of identifying the copy of a digital work, whose physical representation have become inherently variable and dynamic.

To the extent that the identity of a copy is determined by social conventions rather than by its physical or digital attributes, any divergence in the content, form, or physical representation of a copy should not affect the identity thereof, provided that it can still be perceived as the same copy by the community of end-users.

The problem is that users are likely to expect different things from a digital copy than they do from a physical copy. Indeed, while a physical copy has always been regarded as a static entity which can only subsist under the form of a token, in the digital environment, instead, the copy of a work is regarded as a much more flexible entity which can assume a variety of forms and which can subsist in many different places at the same time.

The objective of this section is, therefore, to determine which one of the constitutive elements of the work is the most appropriate to assume the function of a copy, given the advent of digital technologies. Indeed, although a digital work could theoretically be described by any of its constitutive elements, they each provide a different definition of the overall scope of the work. For instance, the scope of a literary work may vary according to whether the work has been defined according to its general concept (e.g. Hamlet by Shakespeare), according to the manner in which it has been expressed (e.g. Hamlet's original draft, as opposed to the French translation thereof), or according to the way in which it is being conveyed to the public (e.g. the hard-cover edition of Hamlet, as opposed to the paper-back edition thereof). Moreover, in the digital environment, the scope a work may be further circumscribed by the manner in which it has been packaged for the digital medium (e.g. the DRM-protected PDF of Hamlet, as opposed of the unprotected version thereof) and by the way it has been encoded into a digital file (e.g. the ASCII version of the Hamlet, as opposed to the UTF-8 version thereof).

In view of their generic character, neither the `work_t` as a general concept, nor the `expression_t` or the `manifestation_t` are likely to constitute a suitable alternative. Identifying the copy of a work according to the

general concept it embodies is in fact likely to be too general, as it would not account for the copyright vesting in the different expressions_t of the work. Likewise, identifying the instance of a work according to the way it has been expressed would necessarily ignore the distinction between different manifestations_t and their specific characteristics of form. This would preclude the possibility for rights holders to price discriminate against consumers by selecting the format in which the work is being conveyed to the public (i.e. in terms of its quality, size, or functionality) or by modifying the terms and conditions according to which the work can be legitimately exploited (i.e. according to the level of restrictions incorporated into the copyright license).⁶⁶⁴ Finally, identifying the copy of a work on the basis of the manifestation_t is likely to be too restrictive to the extent that it would prevent the incorporation of any changes to the digital representation of the work, as a result of operations such as compression or encryption.

If the objective is to allow for the different copies of a work to maintain a consistent identity over time in spite of the changes they may incur in terms of their physical or digital representation, the structure of the FRBR framework may need to be revised, so as to provide a more accurate description of the various elements that constitute a digital work. Yet, given the overall simplicity and generality of its current terminology, adjusting the FRBR to the new technological framework is unlikely to require any radical changes to the underlying structure of the taxonomy.

The proper identification of the copies of a digital work could be achieved through the introduction of a new entity, whose function is to complement the function assumed by the original entities of the FRBR framework. In other words, for the FRBR to qualify as an ontological framework that can be employed in the digital environment as well as in the physical environment, an additional entity could be added to the FRBR framework in order to identify those specific aspects of a digital work that do not have a counterpart in the physical world.

The function assumed by this newly introduced entity would be to act as a link between the higher layers of abstraction that characterize the work, as an abstract and conceptual entity, and the lower layers of abstraction that identify its different representations in the real world. Hence, while the standard entities described within the FRBR framework (i.e. the work_t, the expression_t, the manifestation_t and the item_t) would still play a fundamental role in establishing the identity of a work according to the nature, the content, as well as the formal and physical attributes thereof, a new entity (hereinafter referred to as the ‘digital entity’) could be used as a mechanism to identify the relevant aspects of the work which are specific to the digital world.

⁶⁶⁴ With regard to information goods, price discrimination can be achieved by charging different prices for the same product according to the identity of the customers and/or according to the specific characteristics of the product (i.e. versioning). In order to prevent arbitrage between consumers, content providers are likely to incorporate certain metadata into the digital Work so as to identify the individual purchaser and/or the particular rights and obligations vesting in the work. If two digital documents were to be regarded as the same Work, regardless of the fact that metadata or particular technological measures of protections have been incorporated, arbitrage could no longer be prevented and any strategy of price discrimination would therefore be destined to fail. For more details on price discrimination as applied to information goods, see e.g. FORMANKO, M. (2004) Versioning information goods in digital libraries. *Department of Information Business*. Vienna University of Economics and Business Organization.

A. THE DIGITAL ENTITY

The digital entity is fundamentally a logical fiction which serves the function of regrouping the different instances of a work together under a common framework to the extent that they can be regarded as being logically equivalent to each other and in spite of the fact that they may actually differ in terms of their physical or digital manifestation_t.

Though most differences in the physical representation of a work are irrelevant when it comes to establishing the identity of a digital copy, differences in the digital representation of a work, instead, may or may not affect the identity of a digital copy depending upon their nature and type. While the encoding of a work into a different format will necessarily produce a different manifestation_t,⁶⁶⁵ the latter may not necessarily qualify as a different copy of the work. Under certain circumstances, in fact, different instances of a work can be regarded as the same digital entity, even if they have been encoded into a different format.⁶⁶⁶ While the form of the content may change (e.g. as a result of the work being converted from one format to another, or as a result of compression, encryption, or other type of conversion), the digital entity could nonetheless preserve its identity provided that the content can be reverted back and forth from one format to another without any loss of information.

The purpose of the digital entity is fundamentally twofold. On the one hand, it allows for the copy of a work to assume a series of different formats while nevertheless maintaining its identity over time. On the other hand, it makes it possible to distinguish between the different instances of a work which share identical characteristics of form on the basis of contingent properties, such as e.g. their legal status.

Accordingly, in spite of them both incorporating the same manifestation_t, a digital entity would necessarily distinguish itself from other digital entities incorporating the same work, to the extent that they differ with

⁶⁶⁵ Every manifestation of a Work can be described as the particular representation of a Work (1) composed of particular signs or symbol of a textual, musical, graphical or audiovisual nature (2) encoded into a particular medium: e.g. book, tape, CD, DVD, etc (3) with particular physical/digital characteristics of form: e.g. layout, volume, resolution, etc. For more details, see IFLA (1998) Functional Requirements for Bibliographic Records. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records, IFLA (2007) FRBR object-oriented definition and mapping to FRBRer. IN DOERR, M. & BOEUF, P. L. (Eds.). International Working Group on FRBR and CIDOC CRM Harmonization. Accordingly, a literary Work incorporated into a book necessarily amounts to a different manifestation than the same Work expressed into a PDF format or a Microsoft Word format. Similarly, a musical Work recorded into a vinyl necessarily amounts to different manifestation than the same work encoded into a MP3 format, which may itself amount to two different manifestations of the same Work according to whether it has been encoded into a 128kbps MP3 format or a 48kbps MP3 format.

⁶⁶⁶ There are many situations where a technological process may cause a digital document to assume a different combination of bits without however affecting the actual content of the document. Common examples of such processes relate to straightforward conversions (e.g. changing the character encoding of a file from UTF-8 to UTF-16, or from ASCII to EBCDIC, etc), optimization, lossless compression, encryption, etc. Most of these processes may even take place automatically without users being aware of it, for instance, whenever a file is moved from one disk to another disk with a different file system. In any case, the identity of a digital document is maintained provided that the content of a digital document has not been altered as such, or provided that the process is at least reversible. For a more detailed analysis, see RENEAR, A. & DUBIN, D. Towards Identity Conditions for Digital Documents. *Library and Information Science*. University of Illinois.

regard to the way in which the work can be accessed or consumed.⁶⁶⁷ For example, while a song encoded into the MP3 format might be regarded as being logically equivalent to the OGG version thereof,⁶⁶⁸ the same song incorporated into a proprietary format constraining the use and the exploitation of the work will necessarily amount to a different digital entity.

In addition, to the extent that it may affect the way in which a work can actually be experienced, the digital entity must necessarily account for technological measures of protections, as well as the corresponding metadata regulating the way in which the content can be legitimately consumed. Different instances of the work may therefore distinguish themselves insofar as they incorporate a different set of metadata, with reference to e.g. the identity of the user who acquired the copy or the particular terms and conditions under which it has been released.⁶⁶⁹ Indeed, while metadata has traditionally been employed to facilitate the consumption of a work,⁶⁷⁰ in the digital environment, incorporating metadata has become increasingly more convenient as a result of the flexibility and extensibility of digital media.⁶⁷¹ Different kinds of metadata can,

⁶⁶⁷ A digital entity can essentially be regarded as a digital package into which a particular digital manifestation has been embodied. Accordingly, different digital entities which are an instance of the same manifestation may distinguish themselves according to the way in which the work they embody has been made available to the public. If the digital work has been distributed as such, the digital entity will basically consist of an empty package and will therefore be identical to the digital manifestation it incorporates. Instead, if the digital work comes together with metadata, every possible combination of metadata will give rise to a different digital entity, in spite of the fact that they all incorporate the same digital manifestation of the work. Similarly, if the digital work is subject a particular DRM system, a new digital entity will be created, and a different digital entity will be generated for every different set of restrictions implemented by the technological measure of protection.

⁶⁶⁸ MP3 and OggVorbis are two different formats for music encoding. The OggVorbis format is a free, open standard format which is unrestricted by any software patent, whereas, the MP3 format is a proprietary format which is subject to a large number of patents concerning the encoding and compression algorithm. The validity of the patents is however unclear, and since they have been for the most part not enforced, a large number of software programs have been developed in order for users to convert their digital songs from the MP3 to the OggVorbis format and vice versa. See, *inter alia*, <http://www.audio-converter.com>, <http://blazemp.com>, <http://ogg-mp3.net>, etc.

⁶⁶⁹ The identity of a digital document do not only depends on the content it embodies, but also on the distinctive characteristics that are specific to that particular documents. Just like a book which has been specifically autographed by the author is different from another book of the same kind, a digital document which has been adorned with particular metadata is different from a similar digital document devoid of any metadata. In particular, metadata may be used to provide information concerning every aspect of the digital document, such as the content, the format, or the history of the document, but also the legal status and the various rights and obligations that have been vested into the Work. For more details on the various way in which metadata can be used to describe a digital document, see e.g. NILSSON, J. (2006) Preserving physical structure of digital objects through metadata. *Department of Business Administration and Social Sciences*. Lulea University of Technology.

⁶⁷⁰ In the physical world, for instance, many information goods already incorporate information describing the work they embody (such as, e.g. an abstract, an index, or a table of contents) and the various stake-holders involved (such as, e.g. the author, the publisher, etc).

⁶⁷¹ An information good essentially amounts to a collection of correlated information into one single and identifiable object. While, in the physical world, all the information has to be packaged together into an actual tangible good, in the digital environment, an information good operates instead like a logical container of information which may aggregates various packages of information either directly by incorporating them into the digital entity or indirectly by linking to the external location where they can eventually be retrieved. The latter technique is the most advantageous, as it allows, on the one hand, to incorporate a large number of information and/or metadata into a digital file without unnecessarily increasing its size, and, on the other hand, to have this information and/or

nowadays, be encapsulated into a digital work depending upon the intended purposes. For instance, a particular framework of metadata could be used to disclose any information concerning the distinctive properties and characteristics of a digital copy, such as the identity of the user who acquired it, the identity of the author and of the copyright owner, the date in which it has been created, and, most relevant to copyright law, the particular terms and conditions regulating the access to and the usage of the different parts of the work.⁶⁷²

The digital entity could therefore ultimately assume the function of a 'copy' in the digital environment, as an alternative to the physical item_t.⁶⁷³ Through the notion of the digital entity, the copy of a digital work could in fact be defined to comprise every instance of the work which has been conveyed to the public in an equivalent package, without accounting for the format it may assume in the physical or in the digital environment. From a practical standpoint, however, the problem is to determine whether, and when, are the different instances of a work to be regarded as the same digital entity, without relying upon the specific sequence of bits that they are actually made of. In particular, in order to properly establish the scope of a digital entity, it is necessary to identify the conditions that must be fulfilled for any given instance of the work, for it to be regarded as being logically equivalent to another instance of the same work.

As a general rule, equivalence at the level of the digital entity can be established when different digital files can be converted back and forth from one format to the other without any loss in terms of quality or data. Provided that the original format can be perfectly restored and that the original content has remained unaffected, different digital files will qualify as the same digital entity even though they incorporate a different manifestation_t of the work. Accordingly, the compression, encryption or conversion of a digital work would only give rise to a new digital entity to the extent that it would actually have an effect upon the way in which the work is being perceived by the public. Conversely, to the extent that the different formats into which they

metadata be automatically updated without the need of actually accessing the file. For more details, see e.g. DANIEL, R., LAGOZE, C. & PAYETTE, S. D. (1998) A Metadata Architecture for Digital Libraries. *Research and Technology Advances in Digital Libraries*. IEEE International.

⁶⁷² Copyright law protects original works of authorship against the unauthorized exploitation thereof. In order to legitimately use a work, therefore, users must first identify what are the access and usage permissions which have been granted by the holders of the copyright in the work. In order to facilitate the identification of the copyright status of a work, digital works can be encapsulated into information goods along with particular metadata designed to inform every potential user of all the rights and obligations that pertain to any given work. Specific rights expression languages have in fact been developed in order to allow for the terms and conditions of the licenses under which copyright works have been released to be expressed as metadata. See COYLE, K. (2005) Descriptive metadata for copyright status. *First Monday*, 10.

⁶⁷³ In view of the inconsistencies related to the physical representation of a digital work (the item) and the digital representations thereof (the digital file), a higher layer of abstraction must be used in order to properly identify the particular instance of a work in the digital environment. Replacing the notion of a physical copy with a more abstract layer would in fact allow for the identification of any given instance of a digital work in a manner than is more congruent with the general expectations of users. For a more detailed analysis of the various issues related to the proper identification of digital works, see e.g. ANTELMAN, K. (2004) Identifying the Serial Work as a Bibliographic Entity. *Library Resources and Technical Services*, 48.

have been encoded are fundamentally equivalent to each other, different digital files will not qualify as separate digital entities, but rather as different representations of the very same entity.⁶⁷⁴

Provided that this is consistent with the way in which the majority of end-users would perceive the copy of a digital work, the digital entity could therefore constitute a valuable indicator of what constitutes the copy of a work in the digital environment - thereby assuming the same function that has been assigned to the item_t in the physical world. Yet, given the specificities of the digital medium, the concept of the digital entity may run into a series of problems when trying to identify the copy of a digital work consistently over time.

B. PROBLEMS WITH THE DIGITAL ENTITY

In spite of its ontological value, from a practical perspective, the concept of a digital entity unable to fulfill the same role as the one assumed by the item_t in the physical world. On the one hand, given the generic character of the digital entity, it is often difficult to establish the conditions under which the different instances of a work can actually be regarded as an instance of the same digital entity. On the other hand, to the extent that it depends upon the legal status of the work, the definition assigned to the digital entity is incapable of identifying the copy of a digital work whenever the rights and obligations vesting into that particular copy of the work are likely to evolve over time - e.g. whenever the work can only be accessed and/or reproduced for a limited number of times.⁶⁷⁵

Besides, while it may allow for one particular copy of the work to be identified in spite of the changes it may incur in its physical or digital representation, the digital entity is limited to the extent that it does not provide the means to differentiate between the different instances of the work which do not qualify as the same copy, in spite of them being identical on a bitwise level of abstraction. In other words, given that it does not account for

⁶⁷⁴ Although determining equivalence between different encoding may sometimes be a considerably intricate task, as a general rule, it can be safely assumed that two digital formats are to be considered equivalent to the extent that there exists at least one algorithm allowing for the completion of a one-to-one conversion from one format to the other. For instance, in so far as one digital file can be constantly compressed and uncompressed over time, there is virtually no difference between the original version of the file and the compressed version thereof. The same is true for the process of encryption, which fundamentally allows for any digital file to be encrypted according to a particular algorithm in order to be subsequently decrypted whenever the need arises. Similarly, with regard to conversion, it is often possible to convert a digital file from one format to another without actually affecting the way in which the work is being conveyed to the public. For instance, in the case of literary works, the conversion of one file from PDF format to PS format (or vice versa) is unlikely to affect the way in which the work will be perceived by the public. Likewise, to the extent that they feature analogous characteristics of form (e.g. the same quality of video and sound, the same tonality of colors and the same volume), an audiovisual work encoded in a particular format (e.g. DivX) is fundamentally equivalent to many other encodings of the same work (e.g. MPEG-4, Quick Time, Xvid, etc).

⁶⁷⁵ An example may help clarify the problem. If a digital entity were to identify the copy of a musical work protected in such a way that it cannot be played more than ten times, after the song has been played once, the metadata would automatically be updated so that the work can only be played nine more times. As a result of this process, a new digital file would therefore be created, which would distinguish itself from the former on the basis of the new metadata it incorporates (i.e. as a result of its new legal status). To the extent that they are no longer interchangeable with each other, the two digital files could no longer be regarded as being equivalent and would therefore necessarily qualify as two separate digital entities.

the genetic link that necessarily subsists between the different instances of a copy, the concept of a digital entity is likely to be too broad to properly identify the copy of a digital work. In order to qualify as an instance of the same copy, the various instances of a work have to be either directly or indirectly derived from one another. Yet, to the extent that the scope of a digital entity exclusively depends upon the legal and formal attributes of a work, it is likely to encompass every entity that satisfies these criteria, regardless of whether or not they actually derive from the same copy of the work.

Accordingly, while the item_t has become unable to identify the copy of a digital work consistently over time, the digital entity appears equally incapable of identifying the copy a work in line with standard users' expectations in the digital environment.

SECTION 2

PROBLEMS WITH THE FRBR FRAMEWORK

The FRBR is an ontological framework that is fundamentally meant for the identification of bibliographic records. As such, it has been designed to provide a description of the constitutive elements of a work from a bibliographic perspective, rather than from a legal standpoint.

As a matter of fact, every entity that subsists in the world could be described in an indefinite number of manners, whose accuracy may only be determined according to the context of analysis. As such, the definition assigned to the constitutive elements of a work should be determined by the context in which they are being assessed.⁶⁷⁶ In particular, the extent to which the different instances of a work can actually be regarded as an instance of the same copy is likely to differ according to the purpose of analysis - e.g. the definition of a 'copy' according the FRBR framework (i.e. according to a bibliographic perspective) is likely to be different from the definition that would be given by a judge interpreting the provisions of copyright law (i.e. from a legal standpoint).⁶⁷⁷

⁶⁷⁶ This is clearly illustrated with the principle of 'functional granularity' as endorsed by the <indec> framework, according to which any resource can be viewed in an infinite number of ways. In particular, functional granularity requires the provision of a way to identify the various parts and the various versions of a resource whenever the practical need arises. See RUST, G. & BIDE, M. (2000) The <indec> metadata framework: Principles, model and data dictionary., The <indec> Project.

⁶⁷⁷ The distinction between one work and another is done is inevitably subjective to the extent that it is a matter of judgment. For instance, from a legal perspective, the judge is responsible to define the boundaries of a work through the application of a specific set of rules, whereas, from a bibliographic perspective, the cataloguer is the ultimate responsible for distinguishing a work from the other in accordance with bibliographic principles. As a result, given that they base their decision of a different set of rules, it is possible that the judge and the cataloguer will come to radically different conclusions about the very same entity. See e.g. BIDE, M., GREEN, B., HEALY, M. & PHILLIPS, D. W. (2002) UK committee members response to the comments on ISO Committee Draft 2047 of the International Standard Textual Work Code from the International Federation of Library Associations and Institutions (IFLA).

Relying upon the FRBR framework for the purposes of describing the constitutive elements of a particular work of authorship, or for the purposes of identifying the respective stakeholders involved is therefore likely to constitute a viable alternative in a bibliographic context. However, given its focus on the description of bibliographic records for cataloguing purposes, the FRBR may not be equally satisfactory if employed in a different context. To be sure, while it may be employed as the underlying framework for a particular set of metadata to be incorporated into a copyright work, the FRBR may, however, be unable to provide a proper basis of analysis for the identification and representation of the various concepts that represent the basic components of the copyright regime and their relationships with other legal concepts.

In particular, in spite of possible revisions it may incur for the digital environment, it seems unlikely that the FRBR will ever be able to provide a proper ontological framework capable of identifying the copy of a digital work in a way that is consistent with standard users' expectations.

Accordingly, while the FRBR framework constitutes a valuable tool for the purposes of identifying bibliographic records both in the physical and in the digital environment, it does not qualify as a viable alternative to identify the various aspects of a work either in the physical or in the digital environment. While it could nonetheless be employed as an underlying framework for a series of copyright licenses concerned with the commercial exploitation of a work, it cannot be employed in the context of an end-user licensing agreement because it is unable to properly identify the copy of a digital work consistently over time.

DIGITAL COPIES UNDER THE IAO

While the framework of the FRBR is likely to be too conceptual to accurately identify the various instances of a work in the digital environment, the realist approach of the IAO is instead likely to be too restrictive to properly represent every aspect of a work at the higher levels of abstraction. Thanks to the flexibility of its ontological framework, the IAO may however incorporate some of the terminology of the FRBR into its own taxonomy in order to take advantage of its more conceptual character. Even though it may never replace the FRBR in the description and the retrieval of bibliographic records, the IAO may well constitute a viable alternative for the licensing of digital works, in particular in the context of DRM systems. With the help of specifically defined classes, in fact, the structure of the IAO could be extended to provide a more detailed and comprehensive framework that would properly illustrate the way and extent to which the various terms and conditions stipulated in a copyright license actually relate to the various aspects of a work.

In particular, as opposed to the FRBR - which is mainly concerned with the identification of the constitutive elements of a work that subsist at higher layers of abstraction, the IAO has been implemented according to a more realist approach and is therefore more concerned with entities that can be observed in the real world. While this is likely to be an advantage in the physical world, it may however turn out to be somewhat problematic when it comes to the identification of entities that subsist in the digital environment, such as the copy of a digital work.

As a general rule, according to the definition provided by the IAO, the copy of a work is tantamount to the information bearer incorporating a particular instance of the work. Accordingly, to the extent that it incorporates an information content entity (ICE) embodied into a proper information carrier, any physical medium will be regarded as an information bearer that will itself qualify as a particular copy of the work it incorporates. Yet, for the same reasons why the `item_t` has become unable to identify the various copies of a work that subsist in the digital environment, the notion of an information bearer as it has been described by the IAO also fails to serve as a reliable indicator of what constitutes the copy of a digital work.

The issue is therefore to determine whether - and how - the IAO could actually be employed in order to persistently identify the various copies of a work in the digital environment, and how it could eventually be adjusted to consistently distinguish one copy from the others.

SECTION 1

DIGITAL COPY

If the information bearer cannot be relied upon in order to identify the copies of a work in the digital environment, a different entity should be taken into consideration. However, out of the two other entities that

constitute an information artifact, neither the information carrier nor the information content entity is likely to qualify as a practical replacement for identifying the copy of a digital work.

With regard to the information carrier, to the extent that it is intrinsically connected with the information bearer into which it inheres, it cannot itself constitute the fundamental layer of analysis to determine the identity of a digital copy. Relying upon the information carrier as opposed to the information bearer would in fact provide no substantial advantage concerning the identification of a digital copy.

As for the information content entity (ICE), the way it has been defined by the IAO is too specific for it to be regarded as the copy of a work. Indeed, given that it subsists at the level of the manifestation_t (in the FRBR sense), every different encoding of a work would necessarily amount to a separate entity that represents a different ICE and that would basically distinguish itself from the former on the grounds of the new format it assumes (i.e. as a result of the new sequence of bits it is composed of).

As a general rule, in fact, the different manifestations_t assumed by a particular expression_t can be regarded as some kind of encoding.⁶⁷⁸ Indeed, the very same piece of information can be communicated to the public in a variety of manners and be encoded into a variety of formats which basically distinguish themselves from each other by their individual characteristics of form, but which are nonetheless related to each other by the fact that they all incorporate the same content. More precisely, changes in the manifestation_t may either refer to the format in which the content is presented (e.g. different typefaces, font size, or page layout) or to the physical medium into which the content is incorporated (e.g. vinyl, audiotape, or CD-ROM). In addition, in the digital environment, whenever the particular instance of a work is converted from one format to another (i.e. as a result of conversion, compression, or encryption), it necessarily assumes a different manifestation_t. This new manifestation_t fundamentally differs from the former insofar as the new digital file which has been produced is no longer bitwise identical to the original file.⁶⁷⁹ Accordingly, in spite of them all qualifying as a particular representation of the very same content, each one of these different encodings ultimately qualifies as a separate ICE.

There are however many circumstances in which it would be more convenient to regard them as being equivalent to each other, both from the perspective of right holders and from the perspective of end-users. In particular, in the case of digital media, even though different encodings may require a different set of algorithms in order for the content of any given ICE to be properly decoded by a digital device, as soon as the

⁶⁷⁸ As an entity, the manifestation represents the particular format into which a particular expression has been encoded, and the particular medium into which that particular encoding has been incorporated. All identical physical objects that embody an identical intellectual content encoded into an identical form will therefore be regarded as instances of the very same manifestation. See IFLA (1998) *Functional Requirements for Bibliographic Records*. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records. In the digital environment, since the medium is always digital, the only thing that matters in order to determine the identity of a particular manifestation is therefore the encoding as such.

⁶⁷⁹ The characteristic feature of the Manifestation is the format. As a general rule, it is therefore believed that in the digital environment, different file formats constitute different manifestations of the same expression. Accordingly, the PDF version of a work constitutes a different manifestation from the HTML version or the XML version of the same work, even if they all incorporate the exact same content. See *Ibid.*

content can be delivered to the public in a perfectly intelligible way, the actual information conveyed by the different ICE's is likely to be exactly the same.⁶⁸⁰

Amongst the various entities that populate the IAO, other entities should therefore be taken into account in order to assess whether or not they could be employed to determine the identity of a digital copy. Yet, in spite of their relevance in the digital realm, both the concept of the 'digital entity' and the notion of the 'digital document' have eventually been deprecated and have not yet been replaced by any other entity within the framework of the IAO.⁶⁸¹ As of now, therefore, although the terminology of the IAO is sufficiently detailed to accurately describe the various aspects of a physical work, it does not include an entity that specifically allows for the digital copies of a work to be identified.

This apparent limitation notwithstanding, the structure of the IAO is flexible enough to allow for the introduction of additional entities into its ontological framework. In particular, it is possible to implement a series of defined classes whose objective would be to complement the function assumed by the standard entities of the taxonomy in order to identify the various entities that can be associated to the digital copy of a work.

SECTION 2

DIGITAL COPY AS A DEFINED CLASS

As a mid-level ontology, the structure of the IAO is such that its terminology can be arbitrarily extended by means of specifically defined classes. For instance, as it has been formerly established, the notion of the work as a general concept (as it has been identified within the FRBR framework) can be represented within the IAO framework by way of a particular entity that regroups a number of different ICE's into the same class by virtue of the fact that all refer to the same general concept.⁶⁸² Likewise, the different expressions of the work (as they

⁶⁸⁰ The specific format into which a particular piece of information is encoded may or may not affect its content. Every file format has its own specific characteristics, as well as its own advantages and disadvantages. For instance, with regard to the most common graphic file formats, they basically distinguish themselves according to the different quantities of colors that they can deal with, and according to the algorithm they use in order to compress the data. For an overview of the various characteristics of the different file formats, see ASCHENBRENNER, A. (2004) File Format Features and Significant Properties. *Workshop on Digital Preservation*. Beijing, China. Yet, assuming that every other variable is equal, a particular image which has been encoded into GIF and PNG format will be displayed in the same way on the screen of a computer.

⁶⁸¹ Most of the terminology that relates to digital entities (e.g. digital quality, digital entity, binary digital entity, binary executable, digital document, and text based digital document) has been eventually deprecated, pending the implementation of a more reasonable way to identify and describe the encoding of information content entities. However, while obsolete terms usually need to point to their replacement and have the reasons for their obsolescence to be precisely stated, this has not been achieved for neither the digital document nor the digital entity. See <http://code.google.com/p/information-artifact-ontology/issues/detail?id=41>

⁶⁸² Given the realist approach of the IAO, it is not possible to include the concept of a work as a general concept into the overall taxonomy. The framework of the IAO allows however for the addition of defined classes in order to regroup different entities together under a single entity according to arbitrary choices. Accordingly, the notion of a work as a general concept can be simulated

have been defined within the FRBR framework) can also be described within the framework of the IAO through a particular class of ICE's which all incorporate an identical arrangement of signs or symbols.⁶⁸³

Similarly, the notion of a digital copy could theoretically be established by way of a particular set of criteria that precisely establish the extent to which different information bearers could eventually be regarded as belonging to the same class. Yet, while the identity of the work as a general concept and the various expressions of that work can be described by a particular class of entities which subsist at the level of the manifestation_t (i.e. as a class of ICE's), in the case of the digital copy, it is the information bearer (i.e. the item_t) that ultimately constitutes the basic unit of analysis.

In the framework of the IAO, the reintroduction of the notion of a 'digital entity' could therefore be achieved in the form of a defined class that would essentially comprise any information bearer whose individual qualities are such as to fulfill a particular set of criteria. As opposed to a physical entity, which necessarily qualifies as a 'token', a digital entity should rather be regarded as a class (or a 'type') which may be comprised of one or more tokens. Hence, while there can be only one instance of each copy in the physical world, in the digital environment, the copy of a work may potentially be instantiated into a variety of information bearers which may or may not subsist at the same time. As such, a digital copy can no longer qualify as an actual entity with a predetermined scope, but should rather be regarded as a generic placeholder for information bearers which may either gain or lose their pertinence to the class according to their specific attributes of content or form.⁶⁸⁴

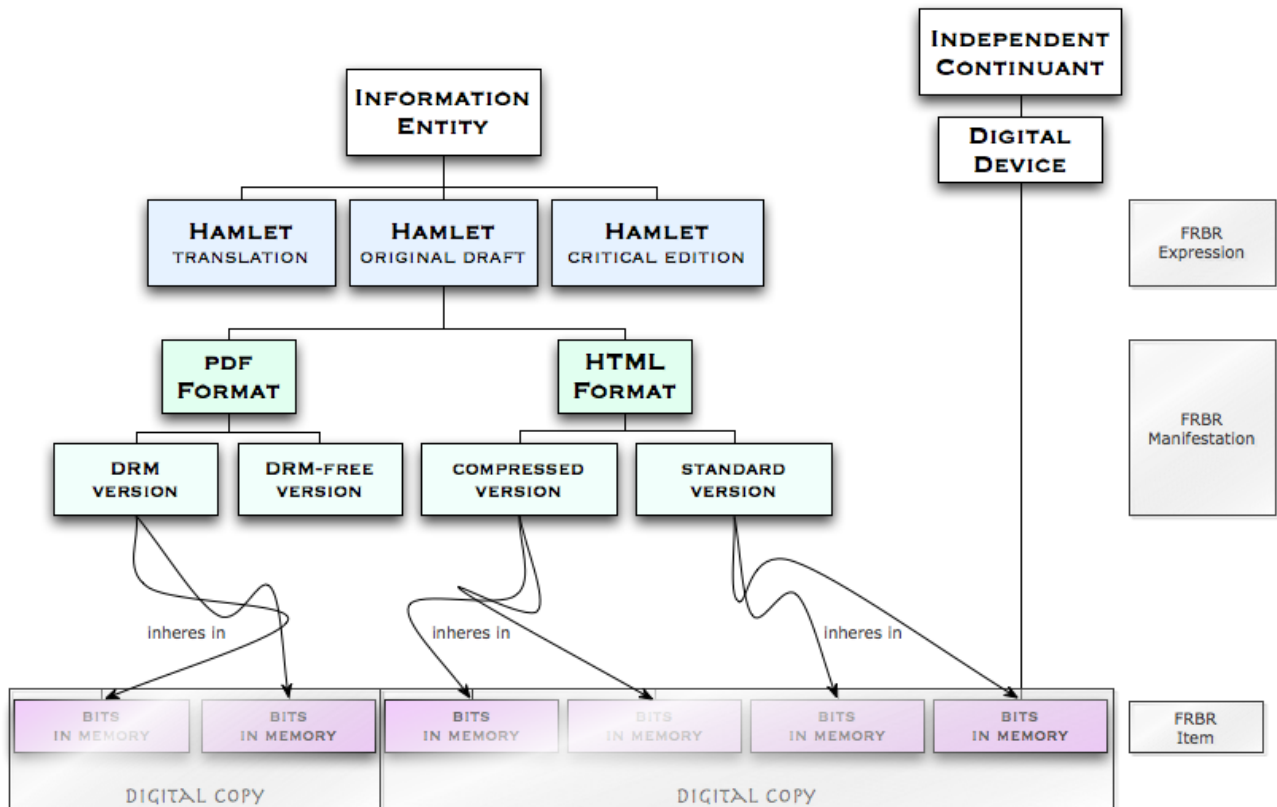
Just like the ICE, the digital entity can therefore be regarded as a particular GDC which may inhere into an indefinite number of independent continuants. Because of its peculiar character, however, the digital entity does not actually subsist at the same level of abstraction as the information content entity. The reason is that, while the ICE has been defined to subsist at the level of the FRBR manifestation_t, the digital entity qualifies

by a defined class which regroups together every ICE whose content refers to the same general concept. For more details, see *supra* Chapter 2. Section 3: The IAO approach. Subsection 3: Relationship with the FRBR.

⁶⁸³ Similarly, although the IAO does not include a term that refers to the expression of a work into its own terminology, it is nonetheless possible to achieve the same result by the means of a defined class which regroups together every ICE that represents a particular manifestation of the same expression. For more details, see *supra* Part II. Chapter 9: The IAO approach. Section 4: Relationship with the FRBR.

⁶⁸⁴ A defined class must precisely stipulate the various requirements which constitute the necessary and sufficient conditions for a particular entity to qualify as a member of the class. As a defined class whose definition is based upon a series of arbitrarily defined criteria, the digital entity does not as such possess a predetermined set of members. Indeed, just as the population of the defined class of students, which basically regroups a particular set of persons that currently qualify as a student, may eventually vary over time as new persons acquire the status of a student and as other persons correspondingly lose it, similarly, the population of any given digital entity, which basically regroups a particular set of independent continuants which currently qualify as an information bearer for a particular kind of ICE, may eventually vary over time as different independent continuant may retain their identity but nonetheless change their classification as a result of acquiring or losing the distinctive attribute of being the information bearer of that particular ICE. As a general rule, therefore, as opposed to a particular set of entities which is ultimately determined by the various instances thereof, a class is an entity that is able to endure through time insofar as the identity thereof is not determined by its members (i.e. a class can survive the turnover in its instances). For more details on the role and the structure of defined class, as opposed to other kinds of entity in an ontology, see MSI (2006) Naming Conventions for Controlled Vocabularies and Ontologies. *Metabolomics Standards Initiative*. Ontology Working Group.

instead as a class which encompasses a series of information bearers (items_t) that fulfill a certain number of requirements.



If the digital entity is intended to represent the copy of a work in the digital environment, its main function is to establish the extent to which the various rights and obligations granted under an end-user licensing agreement are likely to apply to the various instances of the work. Indeed, according to the principle of freedom of contract, the owner of the copyright in a work has the right to determine the manner in which the various instances of the work can be legitimately exploited. Different instances of the same work can therefore be released under a variety of copyright licenses, each featuring a different set of provisions that determine the way in which every copy of the work can be legitimately exploited.

Yet, given that the ‘copy’ no longer has any physical *corpus* in the digital world, the physical attributes of the work can no longer be relied upon in order to determine the range of application for the copyright license. As such, the scope of a digital copy can only be established after having properly identified the criteria that must be taken into account in order to determine the identity thereof.

While the identity of an ICE fundamentally depends upon a series of objective criteria that ultimately refer to (a) the particular combination and the specific arrangement of signs that articulates the work, and (b) the particular way in which they are being conveyed to the public, the identity of a digital entity is likely to depend upon a much larger number of factors, which cannot be independently established.

Even though there is no reliable technique for defining the scope of a digital copy, certain characteristics can nonetheless be regarded as a good indicator for determining the extent to which different instances of a work can be regarded as a particular copy thereof. These includes, on the one hand, the formal properties of the work – i.e. the format assumed by the work as it has been incorporated into that particular medium of expression, and, on the other hand, the legal properties under which that particular instance of the work has been released – i.e. the object and the scope of the rights and obligations granted under the relevant licensing agreement.⁶⁸⁵

Accordingly, given it can only be defined by virtue of its formal and legal attributes, the identity of a digital copy must ultimately be assessed against the provisions of the copyright license under which it has been released. The identity of any digital copy is in fact directly dependent upon the specific terms and conditions that have been incorporated into the license,⁶⁸⁶ which can be regarded as a series of fundamental conditions that must be necessarily fulfilled in order for an instance of the work to qualify as a particular copy thereof.

A. IDENTITY CRITERIA

To the extent that a digital copy may inhere into more than one information bearer at a time, relying upon the physical attributes of any information bearer in order to identify the copy of a work is unlikely to be satisfactory. In the digital environment, the identity of a copy necessarily has to be established according to a different set of criteria which are ultimately determined by the owners of the copyright in the work.

It is important to note that, if the copy qualifies as a defined class, establishing identity between the various instances thereof does not require them to be identical. It suffices to prove that they all feature the distinctive properties which identify that particular copy and which must therefore be shared by all individual members of the copy (i.e. by all its physical embodiments).⁶⁸⁷

⁶⁸⁵ Given that the rights granted under an end-user licensing agreement exclusively refer to one particular copy of the work, the only way to establish the identity of a copy in the digital environment is to analyze the terms and conditions of the license under which it has been released. While the physical representation of a copy may change as it is moved from one device to another, and the digital representation may vary as a result of compression, encryption or conversion, the digital copy will nonetheless retain its identity over time to the extent that it remains in compliance with the terms and conditions of the copyright license. For a more detailed overview of how the concept of a digital copy could be modeled into the framework of the IAO, see *infra* Part II. Chapter 13: Digital Copies under the IAO. Section 2.A: Identity Criteria and Section 2.B: User Identity.

⁶⁸⁶ Since there is objective definition of what constitutes a copy in the digital environment, it could be said, basically, that the concept of a digital copy is ultimately determined by the definition given to the copy in the copyright license. Yet, the identity of any digital copy is fundamentally determined by the various criteria which have been established by the copyright owner at the moment in which the first instance was made. By varying the level of flexibility and the severity of these criteria, the copyright owner can therefore decide the extent to which various digital resources with different properties and attributes could actually be regarded as belonging to the same class and as such qualify as the same copy of the work.

⁶⁸⁷ For instance, if both A and B belong to the same copy (i.e. to a particular set or defined class), there is no need for A and B to be identical, it is sufficient that both possess the distinctive properties which identify that particular copy-class.

An important condition is that all information bearers incorporate the same expression. In fact, given that the copyright ultimately vests in the expression of the work, the scope of any end-user licensing agreement should not extend beyond a specific expression of the work.⁶⁸⁸ While they may not always incorporate an identical ICE, all information bearers that qualify as a particular copy of the work must necessarily incorporate an ICE that represents an identical expression.

Such a condition does not mean, however, that the expression incorporated into the copy of a work may assume any kind of structure or form. Whenever a copy is being licensed to the public, the copyright owner may introduce a series of requirements that the content has to comply with in order for the bearer thereof to be regarded as an instance of that digital copy.

Any information bearer incorporating a particular manifestation of the work will therefore qualify as the same copy of the work only to the extent that it complies with these predefined attributes in terms of both quality and format.⁶⁸⁹ For instance, the owner of the copyright in a literary work may decide to produce a particular copy of the work encoded into the PDF format and require that it stay in that format. Any other encoding of the very same work (e.g. HTML, XML, PostScript, and so forth) would therefore qualify as a different ICE which does not belong to the same digital entity. Likewise, the owner of the copyright in a musical work encoded into the MP3 format may expect it to remain in that format, or alternatively, allow for it to be converted into a variety of different formats (e.g. WAV, WMA, OGG). In addition, the right holder may prescribe that, even though the ICE can be freely converted without affecting the identity of the digital entity, the quality of the encoding has to remain within a particular range (e.g. the identity criteria may require that an MP3 encoded with a quality of 56kbps may only be converted into an MP3 of a lower quality, or into a WAV with a quality of no more than 28kbps).

Other than the characteristics of quality and format which fundamentally represent the way in which a work is being conveyed to the public, the identity of a digital entity is also related to the manner in which the public can actually dispose of the work, which basically depends upon the various rights and obligations that pertain

⁶⁸⁸ Copyright law grants authors with a series of exclusive rights over the expression of their work. As such, they may not exercise their rights over the work as a whole, but only against the exploitation of one particular expression of the work. In fact, according to the idea/expression dichotomy, the copyright owner does not have any control over the general idea of the work but only over the original expression thereof. The owners of the copyright in a work are not entitled to release their works under a copyright license which refers to anything other than the particular expression of which the copyright they own. For more details, see e.g. SAMUELS, E. (1989) The idea-expression dichotomy in copyright law. *Tennessee Law Review*, 56.

⁶⁸⁹ The formal attributes of an ICE may refer either to the specific format it has been encoded into or to the quality thereof. Formal attributes generally refer to the way in which the particular expression of a work is being conveyed to the public. In the digital world, given that the medium of expression necessarily amounts to the 'digital medium', the description of the physical medium into which the digital entity has been incorporated has become irrelevant. Formal attributes may thus only refer to the format in which the expression has been represented, which basically includes the specific appearance and arrangement of the pattern that constitutes the expression, as well the particular format into which it has been encoded and the corresponding quality of the encoding. For a broader overview of the various attributes relevant to identify the digital manifestation of a work, see YOUNGER, J. A. (1997) Resources Description in the Digital Age. *Library Trends*, 45, 462-481.

vesting into that copy. These attributes can be expressed by means of legal metadata,⁶⁹⁰ which can be distinguished according to whether it refers to a particular disposition of the copy (e.g. whether or not it can be copied or reproduced), or to an actual realizable entity (e.g. how many times it can be played or accessed).

In other words, the scope of every digital copy ultimately depends upon the particular set of formal and legal attributes that it has been assigned with when first communicated to the public. To determine whether different instances of a work can be regarded as different instances of the same copy, it is necessary to establish: (1) whether or not they incorporate the same expression; (2) whether said expression has been articulated in compliance with the prerequisites of quality and form established by the copyright license; and (3) whether they all comply (a) with the legal requirements stipulated under the licensing agreement or (b) with the requirements established under the regime of copyright exemptions or fair use. When combined together, these three conditions basically constitute the basic criteria necessary to establish the identity of a digital copy.

To the extent that more than one ICE is capable of fulfilling all of these criteria at the same time, the digital copy is fundamentally an entity that subsists at a higher layer of abstraction than the information content entity. As a result, the identity of a digital copy is generally not affected by changes occurring at any lower level of abstraction, such as, e.g. changes concerning the particular sequence of bits that it is made of. Provided that it has not been precluded by any contractual provisions, encoding a digital work into a different format that does not directly nor indirectly affect the consumption of the work (e.g. compression/decompression) will not produce a new copy of the work but merely a new instance of the same copy.⁶⁹¹

The scope of a digital copy is therefore likely to comprise embodiments of more than one ICE. The same digital entity can in fact be incorporated into many digital files which may differ in terms of their formal or legal characteristics, but could nonetheless qualify as the same digital copy as long as they possess all the necessary attributes to satisfy the criteria established within the licensing agreement. Conversely, the modification of a work at the level of the expression, the alteration or the removal of legal metadata, and the conversion of a digital file into a format which is not endorsed by the formal attributes of the digital entity will necessarily result into the production of a different digital entity which does no longer qualify as the same copy of the work.⁶⁹²

⁶⁹⁰ Legal metadata basically consists of any metadata that refer to the legal status of a work. Various rights expression languages are being used in order to encode legal information into the particular copy of a work, in terms of copyright status, access and use conditions, permissions, rights and obligations, or any other contractual terms that may affect the legitimate exploitation of that copy. Legal metadata may or may not be used in conjunction with DRM systems in order to make sure that the various terms and conditions are actually enforced. For a general overview of how different legal data can be encoded into a particular digital work, see e.g. COYLE, K. (2004) Rights Expression Languages. Library of Congress.

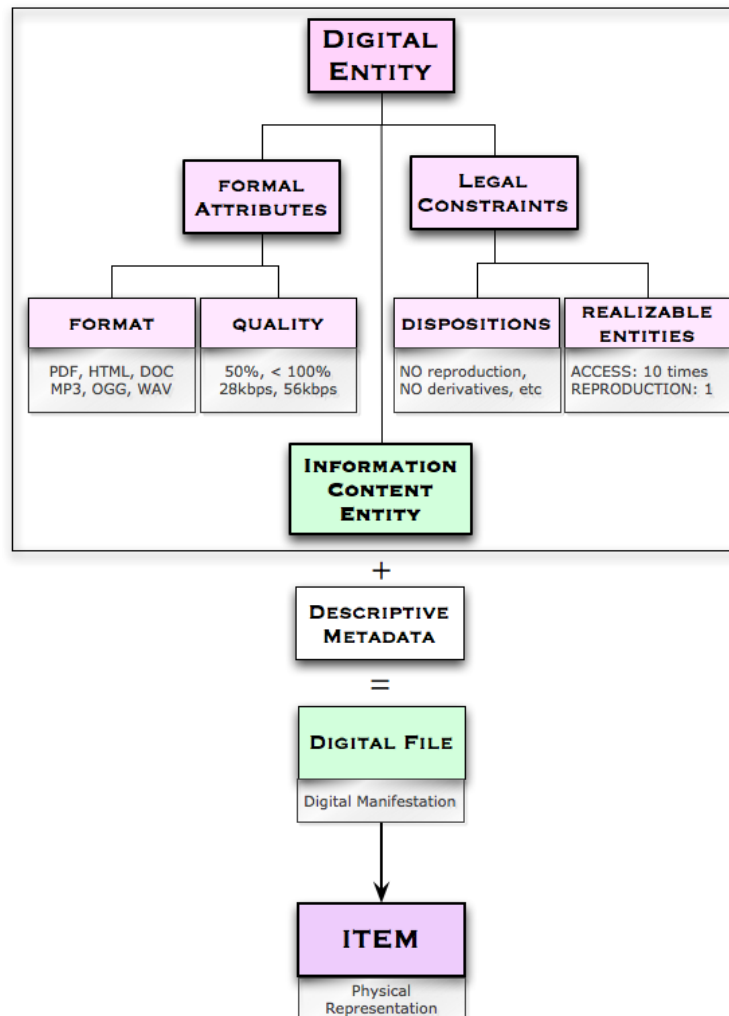
⁶⁹¹ If a digital entity represents the particular copy of a work, the scope of that copy will depend upon the specific attributes of the digital entity. In other words, if the digital entity does not preclude the conversion into a different format, the scope of that particular copy of the work will include more than one manifestation of the work. The encoding of a file into another format will therefore not give rise to a new copy of the work but merely to a new instance of the same copy.

⁶⁹² To the extent that they qualify as rigid properties, the modification of a work at the level of the expression, the alteration or the removal of legal metadata, or the conversion of the work into a format which has not been specifically endorsed, will necessarily lead to the production of a new instance of the work which does no longer qualify as the same copy.

While many other attributes allow for discrimination between different instances of a work, they should however be disregarded in the assessment of whether or not they qualify as the same digital copy. For instance, even though it is intended to provide information concerning a particular copy of the work, descriptive metadata does not, as such, contribute to shaping the identity of that copy.⁶⁹³ Even though a digital work encoded into a format that identifies the title of the work, the name of the author, and the owners of the corresponding rights in the work would necessarily distinguish itself from a work that does not provide any of such information, both should still be regarded as an instance of the same digital entity. Likewise, while the compression or the encryption of a digital file would necessarily result into a new file that consists of a completely different sequence of bits, both should nonetheless be regarded as the same digital entity insofar as the making thereof can be justified under the regime of copyright exemptions.

As a general rule, the copy of a digital work may inhere into an indefinite number of digital files, which may considerably differ in terms of their formal properties and legal attributes. Yet, as long as they retain the distinctive properties of the copy, different instances of the work will ultimately be regarded as different instances of the same copy.

⁶⁹³ Descriptive metadata refers to any information encoded into a digital file that is not directly related to the legal attributes of the file. Descriptive metadata may be used for a large variety of different purposes, such as, for instance, in order to provide the list of persons who are somehow associated with that particular copy of the document (e.g. the producer of that copy) or with the actual content thereof (e.g. the author, or copyright owner); in order to provide a series of relevant bibliographical information concerning that particular document, e.g. the date of creation, date of publication, name of the author, editor or publisher, etc. As opposed to legal metadata which actually affect the properties of a digital document, descriptive metadata does not have any impact upon any of the qualities of the document but merely provide information about the document. For more details on the function assumed by metadata as it is applied to digital documents, see e.g. BOHM, K. & RAKOW, T. C. (1994b) Metadata for multimedia documents. *ACM Sigmod Record*, 23, 21-26.



B. USER IDENTITY

To the extent that they satisfy the identity criteria established by the copyright owner, different instances of a work may qualify as a single copy of the work. In the digital environment, therefore, the copy of a work does not necessarily amount to a single and permanent entity, but may instead occur under the form of different entities which may or may not subsist at the same time.⁶⁹⁴

⁶⁹⁴ As a digital copy is moved from one device to the other, the physical characteristics of the copy are radically altered. Moreover, in the case of DRM systems, the digital characteristics of a copy that cannot be accessed more than 9 times will necessarily mutate every time the copy is being accessed. Besides, assuming that the DRM systems allows for the particular copy of a work to be reproduced for a maximum of 5 times, the copy will eventually be composed of 5 entities which only differ at the level of the physical representation. Likewise, in the framework of Open Content licensing, given that every copy of a work that incorporates an Open Content license can be freely reproduced and disseminated, the scope of the digital copy is likely to be extremely large and dispersed in so far as it would encompass every reproduction of the original copy, but also every reproduction of a former reproduction thereof. Instead, to the extent that certain Open Content licenses also allow for the making of derivative works, the resulting entities will however not qualify the same digital copy as the original in view of the fact that they would actually differ at the level of the expression. For a more detailed overview of how a copy can be defined in the digital environment, see *supra* Part II. Chapter 11: The Identity of Digital Copies. Section 1.D: Preliminary definition of a Digital Copy.

Albeit a necessary condition to determine equality between different instances of a work, identity criteria are not sufficient as such. One additional requirement is that the various items that constitute one copy of the work all be intended for the same user or for the same category of users. Accordingly, whether or not different entities qualify as the same digital copy ultimately depends upon the identity of the users they have been released to.

In the physical world, when a work is released to the public, different copies of the work are produced and subsequently assigned to a variety of users who are willing to consume the work. Although they can be transferred to third parties by virtue of the doctrine of exhaustion, as a general rule, every copy of the work is essentially associated to a single user (e.g. in the case of most end-user licensing agreements) or category of users (e.g. in the case of certain institutions or corporations).

By analogy, in the digital environment, different instances of a work can be regarded as the same copy of the work only insofar as they have been released to the same user or to the same categories of end-users. Even though they fulfill the very criteria in terms of formal and legal requirements, different instances of a work assigned to a different category of users will nonetheless distinguish themselves from each other to the extent that they do not qualify as the same copy of the work.⁶⁹⁵

The identity of the user to which the copy has been released basically determines the scope of the digital copy. For instance, in the case of most public licenses addressed to the public at large, the scope of the digital copy is likely to be very broad because the identity thereof does not depend upon the identity of users. Provided that every formal and legal requirement has been fulfilled, anyone who has a legitimate claim over that particular copy of the work will be entitled to consume the work according to the terms and conditions of the copyright license, regardless of the manner in which the (particular instance of the) copy has been obtained.

Conversely, in the case of most end-user licensing agreements which are specific to one user, the scope of the digital copy is likely to be considerably restrained. In spite of the fact they may fulfill the same identity criteria, the user to whom one particular instance of the work has been assigned does not have any legitimate claim over other instances of the work which have been assigned to a different set of users.

An intermediate situation can be observed in the case of copyright licenses which are addressed to only a particular category of users but that do not actually specify the identity thereof. These categories can be defined in broad terms (such as European citizens, academics and researches, non-profit institutions or non-commercial users, etc) or in a more restrictive manner (such as a particular institution or association). In this

⁶⁹⁵ A digital entity essentially has the function of regrouping together a series of items which can be logically regarded as the same copy of a work. As such, the identity of a digital entity is not concerned with the physical representation of a digital work (i.e. the way in which it is represented in the physical memory of a digital device), but only with the digital representation thereof (i.e. the way in which it has been encoded into a digital medium). Yet, the digital entity fundamentally differs from the concept of a digital file in at least two ways. On the one hand, the digital entity can be much more flexible than a digital file because it is not limited to one particular sequence of bits insofar as it may assume more than one digital representation. On the other hand, however, the identity of a digital entity can be much narrower than that of a digital file to the extent that different items that incorporate the same sequence of bits may actually not all qualify as the same digital entity depending upon whether or not they have been released to the same user or to the same category of users.

latter case, every user will therefore be entitled to consume only that particular copy of the work which has been assigned to that specific category of users to which he or she belongs.

Yet, as it has been formerly established, the copy of a digital work no longer qualifies as a token but rather as a type (a GDC), capable of multiple instantiations. As such, it can be defined as a class – which basically incorporates all information bearers whose properties are compatible with the formal and legal requirements of the copyright license under which the copy has been released.

In spite of the additional level of complexity that this may generate, the benefit of this approach is fundamentally twofold.

On the one hand, it provides for a more practical consumption of works by end-users. In fact, to the extent that they have a legitimate claim over the copy of a work, users are no longer limited to one physical instance of the work, but could theoretically rely upon every other instance of the work that qualifies as the same copy. Every user who acquired the right to the copy of a digital work would therefore be entitled to consume different instances of the same copy obtained from a variety of different sources, provided that they have been addressed to the same user or to the same category of users.

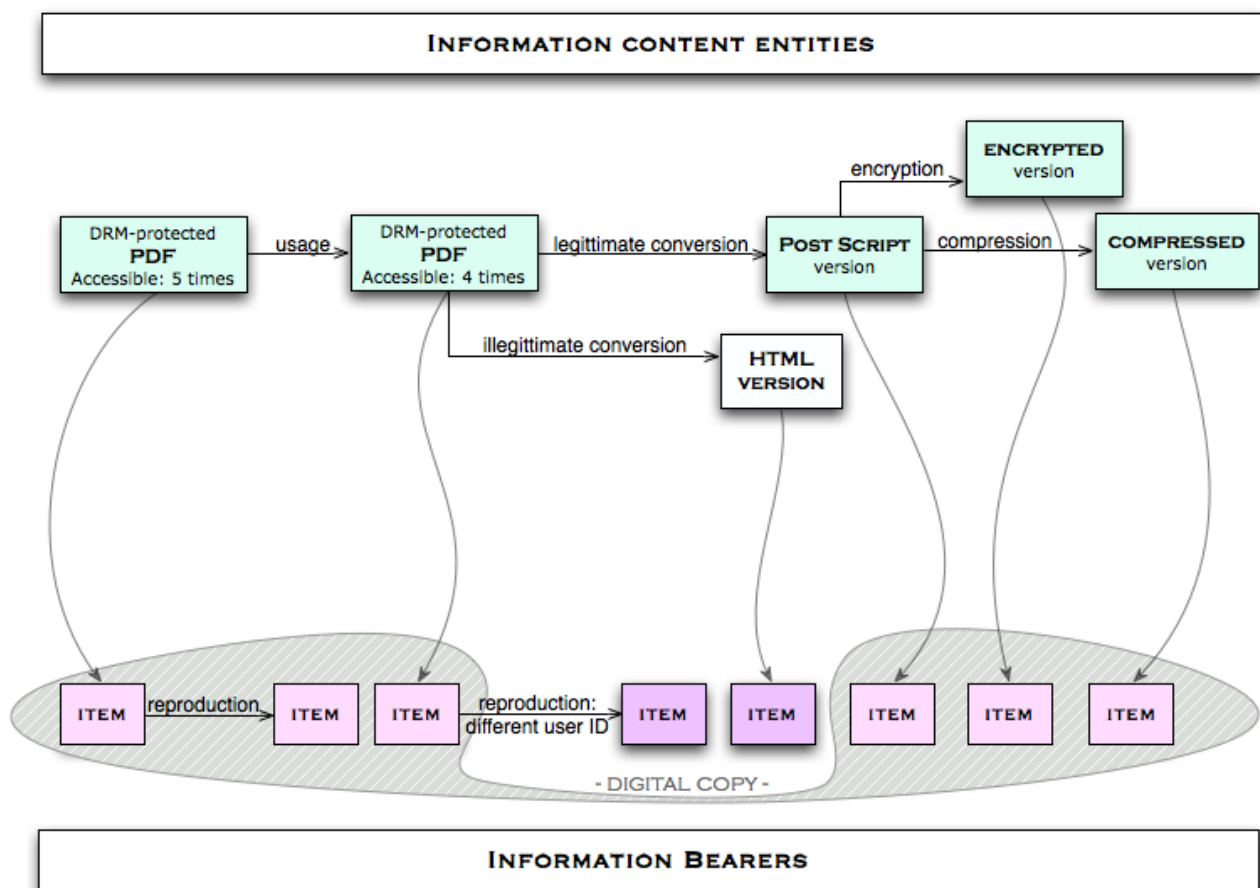
On the other hand, it allows for every copy of the work to be reproduced indefinitely and for any purpose whatsoever. Indeed, to the extent that it fulfills the legal and formal requirements stipulated by the copyright license, reproducing the instance of a digital copy - either in an identical format or in an alternative one - would not necessarily produce a new copy of the work but only a new instance of the copy.

In this regard, it is useful to distinguish between the reproduction of a copy (which is likely to lead to copyright infringement unless it has been allowed by the copyright owner or it can be justified under the regime of copyright exemptions), and the reproduction of a particular instance of the copy (which can be regarded as a legitimate activity as long as it does not lead to a new copy of the work being produced). Copyright infringement only arises if the resulting instance no longer qualifies as the same copy of the work by virtue of the fact that it does not fulfill all the necessary criteria. These criteria may relate to either the legal and formal requirements of the copyright license or to the identity of the users to which the copy has been licensed. While the former would necessarily lead to the production of an infringing copy, the latter may qualify either as a legitimate or as an illegitimate copy according to the provisions of the licensing agreement. In particular, in the case of a digital entity that is characterized by a particular disposition of not being reproducible, the reproduction thereof will be precluded only to the extent that it would generate a new instance of the work, which no longer qualifies as the same digital entity (i.e. because it does not refer to the same user or category of end-users). Conversely, in any case where the digital copy does not actually preclude reproduction, the duplication thereof will be allowed even if the identity of the user to which the copy ultimately refers is eventually modified, because the user is entitled to produce a new copy of the work that can be consumed by third parties.

As a matter of fact, in spite of them being identical in terms of their digital representation, different copies of a work can only be consumed by the particular group of users for which they have been released. Different users may in fact have a claim over the same copy of the work only to the extent that it is addressed to that particular category of users to which they all belong. Hence, the scope of a digital copy is directly connected to the

identity of the users to which it has been licensed. While the reproduction of a digital copy merely contributes to expanding the boundaries of that digital copy (as a result of a new instance thereof being produced), the production of a new digital copy, which no longer refers to the same user or category of users, will instead qualify as a normal reproduction for the purposes of copyright law.

As a general rule, therefore, the recipient of the license is an important element to be taken into account when identifying the scope of a digital copy. Yet, other factors must be accounted for before the scope of a digital copy can be properly established. In spite of them having a common recipient, the various instances of a work may in fact only be regarded as the same copy to the extent that they each satisfy the conditions established by the copyright owner whenever that particular copy of the work has been licensed to the public. Only after combining the identity criteria stipulated under the licensing agreement with the identity of the users to which the copy refers, is it possible to obtain an accurate approximation of the scope of a digital copy. Establishing equality between the various instances of a work can therefore only be achieved by identifying, on the one hand, the users to which the license is addressed, and, on the other hand, the formal and legal requirements that can be extracted from the terms and conditions of the copyright license.



PRACTICAL IMPLEMENTATION

In spite of the complexity associated with the identification of digital works, a proper ontological framework should provide a mechanism to consistently identify every constitutive element of a work, both in the physical and digital environment. As opposed to the FRBR framework, whose application in the digital environment is limited to the higher layers of abstraction, the IAO is theoretically capable of identifying the copies of a digital work consistently over time. Yet, in order to be actually implemented in the real world, the identification of the different aspects of a work cannot be merely conceptual. As important as it may be from a conceptual point of view, the ontological assessment of the constitutive elements of a work is, in fact, only beneficial insofar as it can be applied in practice. As such, the ontological framework provided by the IAO should constitute the basis for the concrete implementation of a mechanism capable of identifying every element of a work along with its corresponding attributes and properties.

The purpose of this section is to elaborate a mechanism capable of identifying the constitutive elements of a work and representing their corresponding properties and attributes in a way that can be understood by a computer. In particular, the goal is to develop an integrated framework of metadata that is capable of identifying the copy of a work in the digital environment.

The problem is that a series of formal and logical rules must necessarily be developed for the identity of a digital copy to become ascertainable by a computer. While the development of increasingly more sophisticated Right Expression Languages (RELs) may well be an important objective to achieve,⁶⁹⁶ the formalization of knowledge in such a way that it can be properly understood by a machine remains a necessary condition for a comprehensive model of metadata to be established.⁶⁹⁷

⁶⁹⁶ In order for a digital device to understand the information that has been encoded into a digital copy, the various attributes therefore must be expressed into a particular language that is understandable by a machine. Ideally, such a language must be capable to express complex rights expressions at any layer of abstraction and any level of granularity. It should also be generic enough to be theoretically applicable to any type of digital content (e.g. audiovisual, musical, or literary works, software, databases, etc), but also precise enough in order to be able to convey all the necessary information to the various stakeholders involved. Examples of popular rights expression languages include: the XrML (eXtensible rights Markup Language) which is a general purpose REL based on XML that is currently being used to describe the terms and conditions for the exploitation of digital resources, available at <http://www.xrml.org>; and the ODRL (Open Digital Rights Language) which is based on an extensible foundational model constructed over an open architecture to express the various relationships existing between assets, parties, and rights or obligations, available at <http://odrl.net>.

⁶⁹⁷ While a standard rights expression language (REL) is necessary in order to allow for interoperability between different applications, it is not sufficient as such. Indeed, no REL could ever become universally adopted without a particular vocabulary (i.e. dictionary) that is also shared in common amongst all applications. In order to succeed, the standardization of digital rights expression languages must therefore go together with the standardization of a rights data dictionary and vocabulary. See DELGADO, J. & GALLEGÓ, I. (2002) Standardisation of the management of Intellectual Property Rights in multimedia content. *Distributed Multimedia Applications Group*. Universitat Politècnica de Catalunya (UPC).

In particular, a proper framework for metadata should enable end-users to find, access, use and reuse information in the digital environment. As such, it should allow, on the one hand, for the bibliographical description of the particular piece of information that is under assessment, and, on the other hand, for the structural description of the various elements that such information is made of. These elements may further distinguish themselves on the basis of their legal status, to the extent that they are subject to a different level of copyright protection, or insofar as they have been released under different terms and conditions.

A common and standardized framework for both descriptive and legal metadata is likely to be valuable only to the extent that it is based on a common vocabulary that is generally and uniformly understood by everyone. Most importantly, in order to allow for different entities to be consistently identified in different places and at different times, a single, constant, and unique identifier should be assigned to every aspect of the work that is likely to provide relevant information either to right holders or end-users.

SECTION 1

UNIQUE IDENTIFIER

In recent years, the Internet has become one of the most important sources of information. Not only does it provide a digital alternative for content that had previously only been available in the physical world (e.g. many books have been converted into e-books and pretty much any movie or song can now be retrieved in a digital format), but it also constitutes a considerable resource for new content that is born digital and can only be accessed through the Internet.

As a result of this significant increase in information available to the public, the need has arisen for a mechanism allowing for any given piece of information to be consistently and unequivocally identified over time, regardless of the layer of abstraction and the degree of granularity that is taken into account.

In view of its intangible nature, however, the scope of a digital resource is generally difficult to determine. On the one hand, the malleability of the digital medium is such that a particular resource can be encoded into a variety of different formats. On the other hand, given its dynamic character, the content of a digital resource is likely to evolve over time – i.e. as a result of revisions or other kinds of alterations which may result in the emergence of several versions or multiple variants of the same resource.⁶⁹⁸ Because of the variable nature and form of digital content, any mechanism of identification should therefore make it possible to unequivocally

⁶⁹⁸ For the purposes of description, analogue resources are much more convenient in that neither their form nor their content is likely to change after they have been made available to the public. Digital resources are however inherently variable, as they may be revised, updated, extended or otherwise modified at any time. Moreover, in view of the intangible nature of digital content, the boundaries between different entities can sometimes be difficult to determine as various entities may eventually merge in order to produce an entirely new entity, usually as a result of user interaction. Accordingly, as opposed to physical documents, a digital document may only be described as a particular entity that subsists at a specific point in time. See DELSEY, T. (2001) *Reassessing Conventional Paradigms for Document Description*.

identify a particular resource (i.e. by way of a unique ID), while nevertheless being able to distinguish between different versions of that resource whenever a greater level of precision is required.⁶⁹⁹

With regard to the copy of a work, an important problem is that, in the digital environment, a copy may subsist as one or more physical embodiments, which may assume a variety of different formats.⁷⁰⁰ In order to keep track of the copies of a digital work, every digital entity should be assigned a unique identifier to be incorporated into every instance thereof. Besides, even in the case where there exists only one instance of the copy, the physical and/or digital representation thereof is likely to mutate over time. The purpose of the unique identifier is twofold: on the one hand, it provides a mechanism for every copy of a work to be recognized as such even after its form has evolved, and, on the other hand, it allows for every instance of a copy to be recognized as an instance of the same digital entity. In addition, given that the various instances of a copy must necessarily be associated to the same user or to the same category of end-users,⁷⁰¹ multiple entities which satisfy the very same identity criteria could nonetheless be regarded as belonging to different copies of the work. In spite of their apparent similarity, every instance that does not qualify as a particular copy of the work should be assigned a different ID in order to be explicitly distinguished from the other instances thereof.

Thus far, a proper mechanism for the description and identification of digital resources has yet to be developed. For instance, while the URL scheme has become the customary mechanism to identify a digital document according to its corresponding location on the World Wide Web,⁷⁰² it is not a reliable system of identification. Since the same document may exist at different places at the same time and is likely to change location over time, the URL scheme is unable to keep pace with the flexibility and volatility inherent to the

⁶⁹⁹ It is impossible to objectively determine the exact amount of alteration that must be imposed on a particular resource before it can no longer be regarded as the same resource. The amount of similarity required for a particular document to retain its identity is in fact necessarily a subjective judgment which is thus likely to vary from one person to the other. In particular, the granularity required for the proper identification of a particular piece of content is likely to vary according to the context in which content has to be identified. Accordingly, in order to give users the opportunity to decide by themselves whether or not different versions of a document belong to the same entity, it should be possible for them to access all the versions of that document through a single request involving the ID of the generic entity, while also being able to directly access every successive version of that document through their corresponding IDs, which could consist of the ID of the generic entity with additional elements to help distinguish between versions. See GLADNEY, H. M. (2002) A Digital Resource Identifier: Prelude to Trustworthy, Durable Digital Documents. California, HMG Consulting.

⁷⁰⁰ As opposed to a physical copy, the digital copy of a work does not qualify as a concrete entity with a fixed structure, but rather as an intangible entity whose scope is ultimately defined by the terms and conditions of license under which it has been released. In certain cases, therefore, a digital copy may be defined in such a way as to allow for it to be instantiated into a variety of different entities with similar or different forms. For a detailed overview of how the notion of a 'copy' differs in the physical and in the digital environment, see *supra* Part II. Chapter 11: The Identity of Digital Copies. Section 1.D: Preliminary definition of a Digital Copy.

⁷⁰¹ In order to qualify a particular copy of the work, every instance must fulfill all of the identity criteria (which are determined by the terms and conditions of the copyright license), which must have been addressed to the same user or category of users. For more details, see *supra* Part II. Chapter 13: Digital Copies under the IAO. Section 2.A: Identity Criteria and Section 2.B: User Identity.

⁷⁰² The Uniform Resource Locator (URL) is a particular type of Uniform Resource Identifier (URI) used for the identification and access of resources via the Internet. The URL does not however describe a particular resource as such, but merely define it by way of its physical location on the Internet network. For more details, see BERNERS-LEE, T., MASINTER, L. & MCCAILL, M. (1994) Uniform Resource Locators. *RFC 1738*. <http://www.ietf.org/rfc/rfc1738.txt>.

digital environment. Alternative schemes, such as the PURL,⁷⁰³ the URN,⁷⁰⁴ and the DOI,⁷⁰⁵ have been developed in order to identify a digital document according to the actual content thereof, but they are somewhat impractical in that they do not provide a mechanism allowing both for the identification of a digital work and for the actual description of its constitutive elements.⁷⁰⁶

There is, therefore, a need for the implementation of a system of identification that is capable of describing a digital work at different levels of abstraction. The mechanism should rely upon a flexible schema which can be applied to any type of work - regardless of its content or form. In particular, the system should allow for every constitutive element of a work to be assigned a unique identifier that could be used in conjunction with metadata in order for any digital device to be able to identify the different entities that constitute a digital work along with the corresponding rights and obligations that pertain to each layer.⁷⁰⁷

⁷⁰³ A Persistent Uniform Resource Locator (PURL) is a particular Uniform Resource Locator (URL) which essentially constitutes an intermediary step in the process of accessing a particular resource on the World Wide Web. Whenever a user access a PURL, it will be redirected to the actual location of the digital resource the PURL refers to. Accordingly, a PURL is fundamentally a mechanism to provide a more persistent identification of digital resources, in that it will remain the same even when the physical locations of these resources have changed. For more details, see <http://purl.org>

⁷⁰⁴ A Uniform Resource Name (URN) is a particular type of Uniform Resource Identifier (URI) which is used to identify a particular resource on the Internet regardless of its actual location. More precisely, URNs “are intended to serve as persistent, location-independent resource identifiers.” They are “globally unique and persistent even when the resource ceases to exist or becomes unavailable.” Accordingly, the URN could essentially be regarded as the name of a person, whereas the URL would constitute the address where that person is currently domiciled. For more details, see MOATS, R. (1997) Uniform Resource Name (URN). *RFC 2141*. <http://www.ietf.org/rfc/rfc2141.txt>.

⁷⁰⁵ A Digital Object Identifier (DOI) is a particular type of identifier used to identify a digital document independently of its location. In particular, according to the International DOI Foundation, a DOI is “a digital identifier for any object of intellectual property” which is capable of “persistently identifying a piece of intellectual property on a digital network and associating it with related current data in a structured extensible way”. For more details, see <http://www.doi.org>

⁷⁰⁶ In particular, the PURL merely introduces an additional layer of abstraction in order to resolve the concerns regarding the persistency of the URL as an identifier, but still needs to be constantly updated in order to provide a proper link to the actual location of the digital resource. The URN is a persistent identifier which is however incapable of determining the actual location of a digital resource and does allow for the incorporation of metadata. The DOI is perhaps the closest to be an appropriate identifier for digital resources, except for the fact that the assignment of a DOI is done by particular Registration Agencies which are in charge of providing publishers with a particular prefix, so that they can subsequently register a DOI to be assigned to a particular piece of content. Accordingly, a particular piece of content may not have access to a DOI unless the owner of the copyright in that content is willing to subscribe to a particular Registration Agency and register a DOI for that content (which is likely to be costly because most Registration Agencies charge a fee both for the registration and the use of a DOI). In addition, the current implementation of the DOI is only capable of finding the particular copies of the work that the publisher has explicitly associated with the DOI. For a more detailed overview of various identification systems and their respective challenges with the identification of digital resources, see VITIELLO, G. (2004) Identifiers and Identification Systems. *D-Lib Magazine*, 10.

⁷⁰⁷ Metadata can be used for a variety of purposes, such as, inter alia, to define the way the content has been encoded (e.g. data format, encoding, compression, etc), to keep track of how a particular document has changed over time, to determine the actual location of a document, to convey useful information about the content (e.g. author, publisher, date of creation, etc), to describe the composition of the document with a series of logical components, and to determine the rights vesting in the content (e.g. copyright owner and the corresponding rights and obligations of users) and how they relate to the various components of the work. For more

Given the different forms that an identifier may take and the various meanings that it may assume, the design of a mechanism for the identification of digital works is likely to be a complicated task.

To begin with, a distinction should be made between structured IDs, which immediately convey meaningful information about the specific entity they relate to, and opaque IDs, which necessarily have to be resolved before any information can be delivered to users. Both types of IDs have their own advantages and drawbacks. On the one hand, structured IDs are evidently more intelligible for end-users because information is being communicated directly through the ID itself. Accordingly, insofar as they have been properly designed, structured IDs can explicitly describe the relationship that exists between the different elements of a work, given that different expressions of the same work or different manifestations of the same expression will inevitably feature a similar root value in their IDs.⁷⁰⁸ Opaque IDs, on the other hand, are completely unintelligible. Yet, they are generally much more concise and may sometimes be preferred over structured IDs insofar as the resolution mechanism may allow for the same ID to be resolved into a different set of entities, according to the context in which the information has been requested.⁷⁰⁹ The drawback is that they are much less persistent than structured IDs because they usually rely on external mapping services that may not last forever.

In addition, a single type of identifier should be able to describe the different entities that constitute a work in a fairly consistent manner. The ID should thus be designed in such a way as to be capable of uniformly identifying entities of different sorts and their corresponding relationships with each other. In particular, it should be possible for an ID to refer to various kinds of entities, which may in turn refer to a variety of other entities. Indeed, while every constitutive element of a work could fundamentally be regarded as an independent entity capable of being identified independently from the others (e.g. the work can be described by the general concept it embodies, the expression can be defined by a particular combination of signs or symbols, the manifestation can be described by the particular form assumed by a particular medium), with the exception of the work, every one of these constitutive elements is intrinsically connected to the entity that subsists in the upper layer of abstraction (e.g. the expression of a particular work, the manifestation of the

details on the various ways in which metadata can be used to describe a digital document, see e.g. BOHM, K. & RAKOW, T. C. (1994a) Metadata for Multimedia Documents. *SIGMOD-Record Special Issue on Metadata for Digital Media*, 23.

⁷⁰⁸ A structured ID does not have to be resolved before it can be interpreted. The format of a structured ID can in fact be understood by the human brain and is therefore capable of conveying information about the entity it refers to. In particular, since structured IDs are generally made with a hierarchical configuration, the IDs of different but related entities will necessarily share the same root. Accordingly, provided that the structure and design of a particular identification scheme have been disclosed to the public, it would be theoretically possible for anyone to autonomously reconstruct the ID of any given entity. For more details on the advantages and drawbacks of structured IDs, see e.g. NUIYS, C. V. & ALBERTSEN, K. (2003) Identification of Network Accessible Documents: Problem Areas and Suggested Solutions. *Conference on Research and Advanced Technologies for Digital Libraries*. Trondheim, Norway.

⁷⁰⁹ As the format of an opaque ID cannot as such be understood by the human brain, it necessarily has to be resolved through a particular resolution mechanism before it can be comprehended. The advantage is that any given resolution mechanism may be configured so as to resolve a particular ID into a different set of entities subsisting at different levels of abstractions according to the preferences of the user and the specific context of the request: e.g. the resolution mechanism may resolve the same ID into a different document according to the user's preferred format and/or according to whether the request has been submitted from a mobile device or a personal computer. For more details on the advantages and drawbacks of opaque IDs, see e.g. *Ibid*.

particular expression of a work, etc). It would therefore be practical for the ID of any given entity to actually incorporate a reference to the ID of the entity that it is directly dependent upon.

Finally, the ID should be flexible enough to be applied at any level of granularity: to an entire document, to only parts of a document, or to a whole collection of documents. For instance, users should be able to refer to a journal as a collection of articles, to a particular article of that journal, to a specific section of that article, or to any given paragraph or figure within that section. In particular, composite works should be identifiable, as such, through their unique ID, but also provide a reference to the unique ID of every work they comprise.⁷¹⁰

For the purpose of this research, the objective is not to develop an additional standard for the description and the identification of the constitutive elements of digital works. The idea is, rather, to implement a mechanism capable of regrouping different types of identifiers under a common framework, so as to take advantage of the whole variety of schemes developed for the identification of different kinds of works at different layers of abstractions.

Ideally, the identifier of a digital work would be such as to allow for the work to be identified at any layer of abstraction. As such, the ID should consist of different sections that describe the constitutive elements of the work. Every section could be taken either by itself or as part of a more general identifier composed of multiple sections.

In practice, each section would identify a particular entity according to a specific identification scheme, which may or may not be the same as the one used in the others sections. For instance, for the purpose of identifying the constitutive elements of a literary work, the work as a general concept could be properly identified through the name of the author and the title of the work. The expression of the work could instead be defined by way of its ISTC identifier,⁷¹¹ whereas the digital manifestation of that work into a particular e-book could be identified according to its corresponding ISBN.⁷¹² Finally, the digital entity into which it has been incorporated

⁷¹⁰ For instance, a multimedia work or a website can be regarded as one single Work, which should therefore be assigned its own and unique ID. However, to the extent that it is made up of a variety of other Works (which should also be assigned their own and unique ID), the composite Work should provide a reference to the ID of every Works it incorporates. See e.g. GETTY, J. P. (2009) Categories for the Description of Works of Art (CDWA): List of Categories and Definitions. College Art Association.

⁷¹¹ The ISTC (International Standard Text Code) is an identification scheme developed by a group of representatives for librarians, publishers and rights management societies. The ISTC refers to the content of any literary work. Yet, because the ISTC applies at the level of the expression, any revision and/or translation of the text should be assigned a different ISTC. Moreover, the ISTC may be employed at any level of granularity. A book may therefore have an indefinite number of ISTCs: one for the overall content of the book; one for the forewords and one for the rest of the book; or even one for every chapter of the book. An ISTC may also be assigned for a collection of literary works. For more details, see <http://www.istc-international.org>. See also the ISRC (International Standard Recording Code) which identifies the content of sound recordings and musical video recordings; and the ISWC (International Standard Musical Work Code), which identifies the content of musical compositions at the level of the expression (and eventually at the level of the work); and the ISAN (International Standard Audiovisual Number), which identifies the content of audiovisual works at the level of the work.

⁷¹² The ISBN (International Standard Book Number) identifies the manifestation of a literary work. Every different publication of the same work has a different ISBNs, even if only the medium differs (e.g. the hard-cover version and the paper-back version of the same edition have distinct ISBNs). Every ISBN refers to only one particular manifestation, although one publication may have more than one ISBN if it has been co-edited by more than one publisher. For more details, see <http://www.isbn.org>. See also the ISSN

could be defined by the means of a DOI,⁷¹³ and the digital file into which it has been encoded could be described by way of its own MD5-checksum.⁷¹⁴

As a matter of exemplification, the unique ID for a particular e-book embodying a particular manifestation of the work Hamlet by Shakespeare could potentially be implemented in the following form:

| | |
|--------------------------------------|---------------------------------------|
| William Shakespeare:Hamlet | – which identifies the work |
| ISTC:0A9-2002-12B4A105-7 | – which identifies the expression |
| ISBN:978-1-4133-0454-1 | – which identifies the manifestation |
| DOI:10.1000/hdy.2009.9 | – which identifies the digital entity |
| MD5:9e107d9d372bb6826bd81d3542a419d6 | – which identifies the digital file |

In addition, insofar as the copy of a digital work can only be defined in relation to the user or categories of end-users to which it has been assigned, the unique identifier should also incorporate a secondary ID to describe the identity of the user or the category of end-users for which that particular copy of the work has been released. Given that it constitutes an essential element to determine the identity of a digital copy, the user-ID should always be declared - except in the case of public licenses which are directed to the public at large. Just like the other ID, the user-ID could assume many different formats as long as the standard that has been adopted can be properly identified, for instance:

| | |
|---------------------------|--|
| #US.SSN:293-99-0472 | – to identify a US citizen according to the Social Security Number |
| #class:student,non-profit | – to identify a class composed of students and non-profit institutions |

(International Standard Serial Number) for periodical publications at <http://www.issn.org> and the ISMN (International Standard Music Number) for printed music at <http://www.ismn-international.org>.

⁷¹³ The DOI (Digital Object Identifier) can identify any piece of content expressed in digital form. A DOI may refer to any constitutive element of a work: the digital manifestation, the digital document, the digital file, but also physical manifestations, performances, and abstract works. It can be used to identify any type of content (such as text, images, audio, video, software, etc) and may apply at any level of granularity. For more details, see <http://www.doi.org>

⁷¹⁴ The MD5 (Message-Digest algorithm 5) is a particular hash function that is commonly used to check the integrity of a digital file. When the content of a digital file is processed through the algorithm, a specific 128-bit hash value is generated. This value constitutes the MD5 checksum of the file, which is considered to be a reliable fingerprint to verify the identity of the file, since even the smallest change in its sequences of bit would generate a completely different hash value. For more details, see RIVEST, R. (1992) The MD5 Message-Digest Algorithm. *RFC 1321*. Although the MD5 cannot as such be used to identify a particular digital file (because a variety of digital files may share the same MD5 checksum), it still constitutes a good identifier to the extent that it is qualified by the former sections of the identifier.

Under this schema, granularity would be achieved by isolating a particular piece of content from its corresponding expression or manifestation. For instance, in order to refer to a particular paragraph of the book *Hamlet*, or only to certain pages thereof, the unique identifier would assume the following form:

[William Shakespeare:Hamlet][ISTC:0A9-2002-12B4A105-7].paragraph:25

[William Shakespeare:Hamlet][ISTC:0A9-2002-12B4A105-7][ISBN:978-1-4133-0454-1].page:126-159

Complete granularity could of course only be achieved to the extent that a digital work has been properly annotated with the necessary metadata. In particular, whenever a work is composed of multiple parts, each constitutive part of the work should be properly identified and the various attributes thereof be precisely described by means of specific metadata – so that they can be subsequently recognized by an automated system. For instance, in the case of many literary works, although certain components of the work (such as words, sentences, paragraphs, or pages) can be automatically detected, other components (such as the preface, the introduction, the conclusion, or any other arbitrarily defined section of the work) will necessarily have to be expressly defined.

Metadata has an important role to play when it comes to the identification of digital content. By assigning a unique ID to every constitutive element of the work, it becomes possible to determine the extent to which the metadata incorporated into a digital work ultimately applies to the various instances the work – according to whether or not they incorporate the same constitutive element to which the ID refers.

SECTION 2

METADATA

Once the constitutive elements of a work have been properly identified, they can be integrated within a particular framework of metadata in order to describe the relevant characteristics thereof. Every work of authorship is likely to enjoy a series of distinctive characteristics and every copy thereof is likely to distinguish itself from the others on the basis of specific legal attributes. Associating a particular set of metadata to different components of a work can be very practical to the extent that it allows for an accurate description of their respective attributes and properties (descriptive metadata), and for the proper identification of the various rights and obligations pertaining to every part of the work (legal metadata).

In the digital environment, in particular, metadata is likely to assume an increasingly important role for the purposes of identifying different aspects of a digital work and the corresponding terms and conditions regulating the legitimate exploitation thereof. Through the combination of descriptive and legal metadata, the owners of the copyright in a work are in fact given the opportunity to define the actual range of application of

the rights granted under any licensing agreement. This allows end-users to subsequently determine the extent to which they may legitimately exploit the different components of a digital work.⁷¹⁵

A specific framework of metadata should therefore be established, in order to describe different aspects of a digital work through a combination of descriptive and legal metadata. The objective is to provide end-users with an easier and improved mechanism for the consumption of digital works, while simultaneously providing right holders with a more efficient instrument for the licensing and the management of rights. The development of a standardized framework of metadata could eventually achieve that objective, but only to the extent that it is able to precisely stipulate the way in which metadata has to be expressed and subsequently interpreted.

A large number of initiatives have already been established in different fields of application in order to address the issues related with the codification of different types of information into a format that may be understood by a machine. Thus far, a variety of standards have emerged that provide detailed instructions on the use of metadata for the purposes of describing the different aspects of a work (see e.g. the Dublin Core,⁷¹⁶ the

⁷¹⁵ Both descriptive metadata and rights metadata are necessary in order to achieve a complete description of the various rights and obligations vesting into a particular Work. The rights and obligation identified by the metadata must in fact necessarily refer to the entities previously defined by the means of descriptive metadata. In particular, the enforceability of the various rights and obligations are intrinsically connected with the dates of creation or publication of the entity they refer to. Once all relevant metadata has been properly structured, however, the various terms and conditions can be independently interpreted and automatically enforced or communicated to the users by any computer with the relevant DRM system. For more details on the dependence of rights metadata on descriptive metadata, see e.g. RUST, G. (1998) Metadata: The Right Approach. An integrated Model for Descriptive and Rights Metadata in E-commerce. *D-Lib Magazine*.

⁷¹⁶ The Dublin Core Metadata Initiative (DCMI) has developed a standard for the description of information resources. In particular, the Dublin Core standard consists of a set of fifteen entities that can be used in order to describe a wide range of digital resources, such as video, sound, image, text, or any multimedia works. It provides a simple and standardized set of conventions for the creation of metadata that is simple to use and easy to maintain, in view of the simplicity of the model and the extensibility thereof. For more details, see <http://www.dublincore.org/documents/dcmi-terms/>

MARC,⁷¹⁷ the MODS,⁷¹⁸ and the RDF⁷¹⁹ standards) or for the purposes of identifying the different rights and obligations pertaining to the various components of that work (e.g. XrML,⁷²⁰ MPEG-21,⁷²¹ ODRL⁷²²).

Given that they focus on different objectives and that they have been designed with different purposes in mind, different standards may be more appropriate in certain situations than others. Yet, the use of one standard for the description of one particular component of the work does not necessarily preclude the use of another standard for the description of another aspect of the work. In particular, given that different kinds of information are necessary to identify the constitutive elements of a work and to determine the legal status thereof, different standards of metadata could be employed to achieve different purposes. While, on the one hand, descriptive metadata could be used to illustrate the distinctive properties and formal attributes of a work, on the other hand, legal metadata could be used to describe the object and the scope of the rights vesting into the work as a whole, or into the various components thereof.

In order to do so, different systems of metadata should be brought together under a common framework. Indeed, as opposed to one generic framework of metadata, the implementation of a common interface

⁷¹⁷The MARC (Machine-Readable Cataloging) is a standard for the representation and the description of bibliographical information into a format that can be read and understood by computers. To date, most library catalogs make use of the MARC standards in order to categorize their bibliographical records, in particular, in view of the very high degree of granularity it allows. The MARCXML is a particular XML schema based on the MARC standards, which has been adopted, inter alia, by the US Library of Congress, in order to make bibliographical information available to the public. For more details, see <http://www.loc.gov/standards/marcxml/>

⁷¹⁸The MODS (*Metadata Object Description Schema*) is an XML-based schema developed by the US Library of Congress for the description of bibliographic records set that may be used for a variety of purposes. In particular, the MODS standard has been designed in order to constitute a compromise between the complexity of the MARC format and the excessive simplicity of the Dublin Core standard. For more details, see <http://www.loc.gov/standards/mods/>

⁷¹⁹ The Resource Description Framework (RDF) is a standard endorsed by the W3C which has been originally designed in 1999 as standard to be used on top of XML for encoding metadata. It has now evolved into a more generic set of specifications for the description of any kind of resource available on the Internet. For more details, see <http://www.w3.org/RDF>

⁷²⁰ XrML (*eXtensible Rights Markup Language*) provides a universal method for securely specifying and managing rights and conditions associated with all kinds of resources, including digital content. Based on XML schema technology, it is freely extensible and fully compliant with XML namespaces. XrML is currently being used in many commercial solutions, including the DRM system from Microsoft. For more details, see <http://www.xrml.org/>

⁷²¹*MPEG-21 is not only concerned with the description of Intellectual Property rights, but fundamentally aims at defining a framework for multimedia delivery and consumption which could theoretically be used by anyone involved in the delivery and consumption of content. In particular, the goal of MPEG-21 is to define the technology needed to support users to exchange, access, consume, trade and otherwise manipulate digital resources in an efficient, transparent and interoperable way. For more details, see* <http://www.chiariglione.org/mpeg/standards/mpeg-21/mpeg-21.htm>

⁷²² ODRL (Open Digital Rights Language) is a particular Rights Expression Language that supports an extensible vocabulary for the expression of terms and conditions of any piece of content, including permissions, constraints, obligations, conditions, and offers and agreements. The ODRL is an XML-based standard for metadata which is essentially open to public participation. It is made freely available to the public has no licensing requirements. For more details, see <http://www.odrl.net>

integrating different standards would provide greater flexibility in the description of the various components of a work and in the identification of their corresponding rights and obligations.

Moreover, to the extent that they differ in terms of their distinctive properties, different systems of metadata are likely to specialize in the description of different aspects of the work. For instance, while the work can be defined according to its genre, the expression of a work can be described according to its language, whereas any attribute of style would necessarily be regarded as a quality of the manifestation.⁷²³ In addition, the range of options available to every one of these attributes is likely to vary according the type of work they refer to. Indeed, while both a literary and a musical work may have an attribute of genre, the properties of the former (e.g. science-fiction, romance) are unlikely to clash with the properties of the latter (e.g. techno, classic, rock). In order to provide an accurate description of the work and of its constitutive elements, a proper system of metadata should concentrate on the distinctive characteristics of every aspect of the work, rather than on the properties of the work as a whole.

Yet, although they can generally be regarded as independent entities, the various components of a work and the relationship they entertain with each other (or with the constitutive elements of another work of authorship) should be explicitly described.

As a general rule, therefore, a proper framework for metadata should be able to represent the structure of the work as a whole, together with the corresponding arrangement and composition of its individual components. In particular, in order to provide an accurate representation of the entities that populate the FRBR framework (i.e. the work, the expression, the manifestation, and the item) and to describe the relationship that subsists between them, different layers of abstraction should be properly accounted for.

In addition, for the sake of clarity, the description of any constitutive element of the work should include a logical pointer (i.e. a reference) to any external resource it incorporates.⁷²⁴ In terms of granularity, whether a particular component should be identified as a separate entity is a question that should be addressed on the basis of the principle of functional granularity – according to which an element should be distinguished from the rest whenever there is a practical reason to do so.⁷²⁵ In the case of a literary work, for instance, every

⁷²³ Every entity of the FRBR has a different set of attributes by which they may be qualified. For instance, the work may have an author, a title, a genre, etc. The expression may also have an author and a title, but not a genre. However, it may have additional attributes that the work does not have, such as the language of a text, the colors of a picture, etc. Similarly, the manifestation may also have an author and a title, but also a publisher, a date of publication, a medium, and particular dimensions. The item, instead, does not have a title or an author, but may instead have an identifier, a provenance, specific access restrictions, etc. For more details, see IFLA (1998) *Functional Requirements for Bibliographic Records*. IN SAUR, K. G. (Ed., IFLA Study Group on the Functional Requirements for Bibliographic Records).

⁷²⁴ The main purpose of a unique ID is to provide a reference to a particular entity. Accordingly, while an ID can be used by end-users in order to identify and eventually retrieve a specific piece of content or a particular document, it may also be used in order to describe the constitutive elements of another entity which is somehow related to that specific document. For a general overview on the creation and use of unique identifiers for the identification of copyright works, see e.g. PASKIN, N. (1999) *Towards unique identifiers*. *Proceedings of the IEEE*, 87, 1208-1227.

⁷²⁵ A approach based on the principle of functional granularity consists in making explicit all those elements of a Work which are deemed to be useful and/or necessary for the purposes of facilitating the consumption of that Work by allowing for a more efficient

chapter, section, or figure that constitutes the content of a work could be identified as a separate component but only insofar as there is a need for it to be distinguished from the expression as a whole. Granularity could be justified for the purpose of providing users with enhanced navigation, or because the exploitation of that particular components is subject to different terms and conditions than the other components of the work.⁷²⁶

As for the description of the different rights and obligations vesting into the work as a whole or into specific components thereof, legal metadata must be able to distinguish between the various layers of abstraction they ultimately refer to. The owners of the copyright in a work may in fact license their works according to a series of terms and conditions that precisely establish the manner and extent to which different elements of the work can be legitimately exploited. Yet, the range of application of the copyright license ultimately depends upon the particular layer of abstraction to which every provision refers. For instance, rights granted at the level of the work_t (in the FRBR sense) normally allow for the exploitation of a work in any form and for any purpose, as long as it does not infringe upon any of the terms and conditions of the copyright license. Similarly, rights granted at the level of the expression_t or manifestation_t generally allow for a work to be freely disposed of, but only insofar as the expression_t or manifestation_t of the work_t is preserved intact. Finally, rights granted at the level of the item_t exclusively regulate the consumption of that particular item_t of the work as provided by the terms and conditions of the license.⁷²⁷

As a general rule, in view of the specific relationship that subsists between the constitutive elements of a work, the entities that subsist at the lower layers of abstraction automatically inherit the rights and obligations assigned to the entities that subsist at higher levels of abstraction, unless they have been overwritten with an additional set of metadata.⁷²⁸ Likewise, with regard to the granularity of rights, given the structural relationship

identification and navigation of the different resources it is made of, together with a more effective management of the different rights and obligations vesting into every one of these resources. For a more detailed analysis on the application of the principle of functional granularity for the identification of bibliographical records, see e.g. HEANEY, M. (2000) *An Analytical Model of Collections and their Catalogues*. University of Oxford.

⁷²⁶ The level of granularity that should be used for the description of a particular work ultimately depends upon what is the function played by each of its components. Dividing a particular work into different sections of interest may in fact facilitate the consumption of the work, insofar as it allows for users to immediately jump to that section and navigate from there. Higher levels of granularity may also be implemented in order to facilitate the management and the reuse of materials, e.g. by enabling the potential extraction thereof and by regulating the way in which they may or may not be consumed. For more details, see e.g. IRWIN, R., MARTZ, F., NOH, Y. & SUN, D. (2008) *Best Practices for Structural Metadata*. *Yale University Library*.

⁷²⁷ If the license refers to a particular copy of the work (as opposed to the expression as such) the user to which the license has been granted will not be able to use another copy of the work as if it were that particular copy that has been acquired with the license. In fact, while the licensing of rights at the level of the expression will in fact apply to each and every copy of the work, the license under which a particular copy of the work has been released cannot however be applied to any other copy of the work, unless the license specifically allows for the sublicensing of rights. See e.g. XIANG, J., BJORNER, D., CHEN, X., ARIMOTO, Y., OGATA, K., VESTERGAARD, R. & FUTATSUGI, K. (2006) *The Digital Artistic Works: a Domain Analysis and a License Language*. Ishikawa, Japan, Japan Advanced Institute of Science and Technology.

⁷²⁸ For instance, assuming that the expression of a work has been released under a license that do not allow for the commercial exploitation thereof, no one will be entitled to make use of any copy of that work for any commercial purpose whatsoever. However, if a particular manifestation of that work (e.g. a photograph in a very low resolution, or a sound in a very low quality format) is subsequently released under a license allowing for the commercial exploitation thereof, every copy of the work embodying

that subsists amongst the various components of a work, it can generally be assumed that they enjoy the same legal status, unless specifically stated otherwise.⁷²⁹ For instance, in the case of a literary work, the terms and conditions of the copyright license under which it has been released will generally be taken to apply to the content of the work as a whole. Yet, were the work to include a number of images or figures whose copyright belongs to a different set of right holders, the various terms and conditions under which they have been released would have to be expressly specified by means of additional metadata.

The practical implementation of a common framework for metadata should ensure that any existing system of metadata can be integrated into a common interface, where different standards can be combined together in order to describe a work at different layers of abstraction and at different degrees of granularity.

In particular, although different systems of metadata would necessarily have to be interpreted according to different rules or criteria, provided that the relevant sets of criteria have been properly identified by means of their respective headings and namespaces, any digital device should be able to parse and comprehend metadata regardless of the standard to which it belongs. Most importantly, the implementation should be such as to allow for the object of any piece of metadata to be described at different layers of abstraction and at different degrees of granularity. For instance, while a combination of the MODS, RDF and Dublin Core standards could be used to describe the characteristics of the work, the expression and the manifestation of the work, the ODRL standard could instead be employed to represent the rights and obligations vesting in any given digital copy that incorporates the work. Similarly, the structure of legal metadata should be such as to ensure that the object and the scope of the various rights and obligations vesting into one particular copy of the work can be always and unequivocally determined.

Legal metadata can fundamentally be subdivided into two categories: (1) the category of ‘data properties’ - which basically refer to the properties of the digital copy as an abstract entity; and (2) the category of ‘individual properties’ - which are specifically associated to one individual user. In other words, ‘data properties’ represent the formal and legal requirements stipulated by the copyright license whenever a particular copy of the work is released to the public. They can be regarded as a series of objective criteria which contribute to the identity of a digital copy. Conversely, ‘individual properties’ cannot be objectively determined without the identity of the user to which they refer. They basically identify the value assumed by these data properties with reference to a particular user who has a legitimate claim over the copy of a digital

that particular manifestation will be suitable to be exploited commercially. Yet, if this particular manifestation is incorporated into a digital entity that is offered at a lower price than the others but is released under a license that only provides for the work to be exploited commercially in a particular context (e.g. offline, rather than online), the latter license will override the provisions of the former.

⁷²⁹ Any Rights Expression Language (REL) should allow for the identification of any content at any appropriate level of granularity (e.g. a whole book, a chapter, or a paragraph, in the case of literary Works; or an album, a music track, or a particular sample, in the case of musical Works), in order to be able to express the different terms and conditions that may be vesting into the different components of the Work. See BARLAS, C. (2006) Digital Rights Expression Languages (DRELS). *JISC Technology and Standards Watch*, July 2006. Because of the hierarchical structure of this particular framework of metadata, according to which every component of a Work can be regarded as a container incorporating a series of other components, which may in turn incorporate a variety of sub-components, the rights and obligations identified for one particular container will be inherited by every component thereof, unless they have themselves been assigned a different set of metadata.

work. To the extent that they can be compared against the former kind of properties, individual properties represent the fundamental basis of analysis to determine whether or not a user is entitled to consume a particular copy of the work. By comparing the ‘individual properties’ assigned to a particular user of the work with the ‘data properties’ of a digital copy (as a class), any DRM or other automated system can determine whether the former qualifies as an instance of latter, or whether it qualifies as a new copy of the work.

As a general rule, different instances of a work can be regarded as belonging to the same copy insofar as a legitimate link can be established between the various instances of the work which feature analogous characteristics in terms of their formal and legal attributes. In other words, if the instance of a digital work has been assigned to a particular user, different instances of the work which has been licensed to a different user will not qualify as the same copy in spite of the fact that they fulfill the very same identity criteria. If the copy has been licensed to only one user, the individual properties thereof will be directly associated with that particular copy of the work, whereas, if the copy has been released to a larger category of users, every user who has a claim to that particular copy of the work will be assigned a particular set of properties which are specific to that user.

As long as they can be expressed in a formal language that can be understood by a computer, there is virtually no limit to the number of terms and conditions that can be incorporated into the end-user licensing agreement. Yet, the greater is the level of restrictions incorporated into a copyright license, the higher will be the level of complexity of the corresponding legal metadata.

SECTION 3

IDENTIFICATION PROCEDURE

In the digital environment, the ‘copy’ of a work no longer refers to any material entity. The concept refers instead to a more generic entity which is likely to cover more than one resource and is therefore likely to subsist in different places and at different times.

The proper identification of a digital copy is therefore a process that requires a certain level of care. By virtue of their distinctive characteristics, identifying the copies of a digital work is a procedure which can only be performed by means of unique identifiers that unequivocally identify every copy of the work, supported by particular set of metadata to precisely identify the formal and legal constraints associated with every copy thereof. Integrating unique identifiers with a proper framework of metadata is in fact necessary to distinguish between the different instances of a work on the basis of their formal and legal characteristics, as opposed to their physical or digital attributes. In addition, such an integrated framework can be relied upon in order to express the relationship that subsists between different instances of a work according to the way in which they have been derived from each other.

Within the framework of the IAO, any given instance of a work qualifies as a particular copy thereof only to the extent that it can be regarded as an instance of the 'digital entity' that incorporates every formal requirement and legal constraint stipulated by the licensing agreement.

With regard to the formal requirements, they comprise every provision of the copyright license that is concerned with the format or the quality of the work fundamentally. To be sure, the expression_t of a work can be articulated into a variety of manifestations_t which essentially differ on the basis of their distinctive attributes of form. While they each contribute to the identity of the manifestation_t, only some of these attributes actually contribute to the identity of the digital copy.

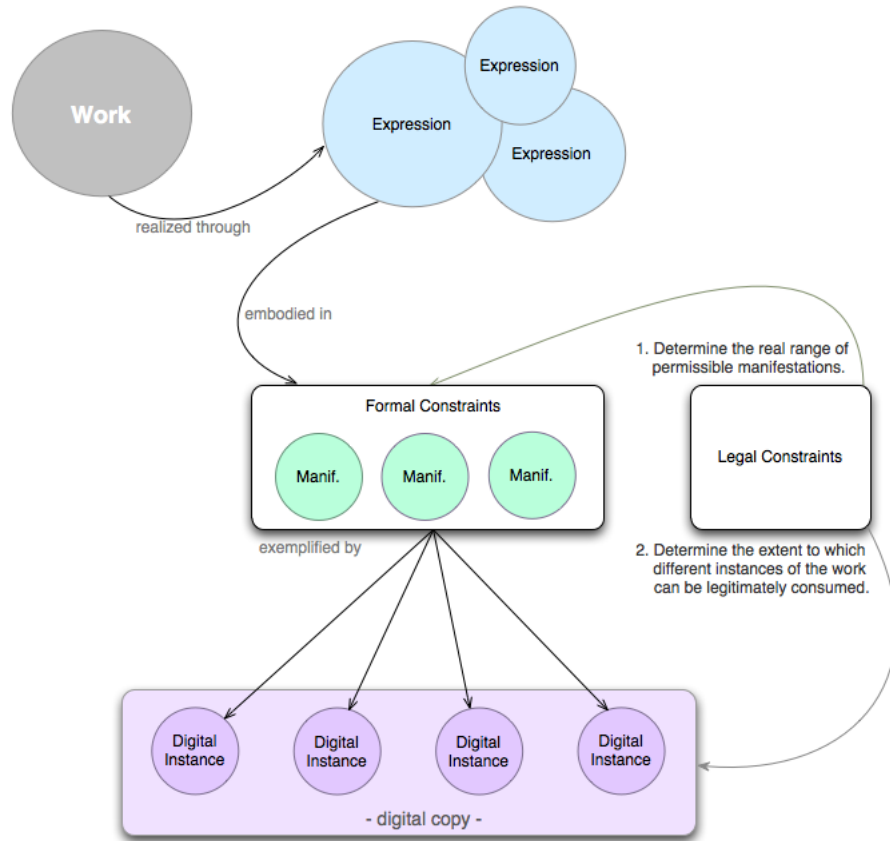
A digital copy can theoretically assume different characteristics of form, which can be regarded as rigid properties (whenever they are a necessary property of the copy) or as non-rigid properties (whenever they do not constitute an element which is necessary for the copy to exist). The classification of a particular attribute as either a rigid or a non-rigid property is essentially arbitrary and ultimately depends upon the terms and conditions of the copyright license under which a particular copy of the work has been released. For instance, if the copyright license stipulates that the copy cannot be converted from one format to another, the way in which the work has been encoded will qualify as a rigid-property because any change in the format will necessarily produce a new copy of the work. Conversely, if the copyright license stipulates that the copy can be converted in any format whatsoever, provided that certain characteristics of quality or form are respected, the digital format of the work will qualify as a non-rigid property that may change without affecting the identity of the copy - whereas, to the extent that they directly contribute to the identity of the copy, the specific characteristics of quality or form will necessarily qualify as a series of rigid properties.

As a general rule, therefore, the formal requirements of the copyright license determine the particular range of formats (manifestations_t) that every instance of the work must assume in order to qualify as a particular copy of the work.

In addition to the formal requirements, the scope of a digital copy is further limited by a series of legal constraints which determine the manner and the extent to which a particular instance of the work can be legitimately accessed or consumed. Legal constraints can be of many different natures and kinds. They may range from the complete prohibition to reproduce, transfer, or modify the content of a digital copy, to a more moderate set of restrictions concerning the context in which a particular activity is either permitted (e.g. in the case of private use) or precluded (e.g. in the case of a prohibition against the commercial exploitation of a work). In addition, restrictions on the use of a digital copy can be further elaborated with reference to the period of time or the number of times a particular copy of the work can be legitimately accessed or consumed, and with regard to the manner in which any exploitation of the work must actually be achieved (e.g. if the copy can only be reproduced in a digital format, or if it can only be accessed on specifically certified devices).

The role assumed by every legal constraint is fundamentally to determine (a) whether the different instances of a work can be regarded as a particular copy, according to whether or not they satisfy the legal requirements of the copyright license, and (b) whether their consumption by a particular user can be regarded as a legitimate act of exploitation, according to whether the individual properties of the user fall within the specific range of values prescribed by the copyright license.

In order to clarify the relationship that subsists between the formal and the legal constraints stipulated under a licensing agreement, a schematic representation may be useful to understand the way in which they are likely to interact with each other in order to determine the identity and the scope of the different copies of a work.



To the extent that every formal requirement and every legal constraint can be expressed within the framework of the IAO as a particular set of criteria that contribute to the identity of a digital entity, it is possible to determine the operation that must be performed in order to identify the copy of a work in the digital environment. The process can fundamentally be subdivided into four different steps, which amount to:

- (1) identifying the various instances of the work that incorporates the same expression as the one identified by the digital entity under assessment;
- (2) making sure that the manner in which the expression has been articulated (i.e. its digital format) is in line with every formal requirement of the licensing agreement, and
- (3) ensuring that the way in which it can be experienced by the public (i.e. its legal status) is compatible with every legal constraint prescribed by the copyright license.

Provided that every one of these conditions have been fulfilled, the last step is:

- (4) to identify whether the user or the categories of users to which the copy has been released is the same amongst the different instances of the work.

By iterating through these four points, any DRM or other automated system can determine whether any given instance of a work can be regarded as a particular copy thereof. If the answer to the four questions is positive, it can be safely concluded that the former can indeed be regarded as a particular instance of the latter. Conversely, were the answer for any one of these questions to be negative, that particular instance of the work would necessarily qualify as a different copy of the work and should therefore be assigned a different unique identifier.

Defining the identity of a digital copy is also important in order to determine the extent to which different users are entitled to consume a particular copy of the work. As a general rule, in fact, every copy of a digital work can be consumed by anyone who belongs to that particular category of users to which the copy has been released. Provided that they pertain to that group, users can theoretically avail themselves of any instance of the work that qualify as a particular copy thereof, to access or use it according to the provisions of the copyright license. In many cases, however, the copy of a digital work has been released under specific terms and conditions that may impose a series of restrictions on the manner and extent to which the work can be legitimately exploited. In those cases, individual properties must be assigned to every user entitled to consume a particular copy of the work, so that these properties can be subsequently compared against the data properties of the copy that they instantiate, in order to determine the legitimacy of the different acts of exploitation performed by each individual user.

Accordingly, in spite of the apparent complexity of the procedure, a properly integrated framework for metadata combined with a series of unique identifiers would considerably simplify the task of identifying the different copies of a work which have been made available to the public. In addition, it would also constitute a resource for an automated system to determine the extent to which different copies of the work can be legitimately exploited by different users or categories of end-users.

CONCLUSION

The advent of Internet and digital technologies has had a considerable impact upon the manner in which information is being produced and consumed. To the extent that any piece of information encoded into a digital format can be reproduced and disseminated much faster and at much lower costs than if it had been embodied into a physical medium, the process of digitization has drastically increased the opportunities for rights holders to distribute their works in the market for information goods. By the same token, however, given that digital content can be reproduced by anyone and at virtually no cost, and redistributed on a worldwide scale in virtually no time, digitization has dramatically increased the level of copyright infringement that occurs on a daily basis over the Internet network. Unless it has been protected by technological measures of protection, digital content can in fact be reproduced indefinitely and further disseminated by anyone who has access to it. In spite of the advantages they might bring, digital technologies are thus likely to reduce the incentives for end-users to purchase digital content directly from right holders or content providers insofar as they can obtain it for free on the Internet.

As a result of these developments, copyright law has had to be reformed. Originally conceived for the physical world, the traditional implementation of the copyright regime was unable to cope with the specificities of the digital environment. Many provisions of the copyright regime had thus to be amended, in order to comply with the new forms of exploitation that emerged with the advent of Internet and digital technologies.⁷³⁰

Traditionally, in order to ensure compliance with the provisions of the law, the copyright regime relied upon the characteristics of the physical medium into which every work of authorship inheres. Starting from the premise that any physical medium qualifies as private good and information as a public good, the copyright regime was an attempt to turn every original work of authorship (as a particular piece of information) into a private good. The objective was the establishment of a self-regulating regime that would realign the legal properties of the work with the physical properties of the medium – in order to ultimately reduce the likelihood of copyright infringement.

In the tangible world, in fact, the physical medium constitutes a natural barrier against copyright infringement. The harder and the more costly it is to reproduce, distribute, or communicate a work to the public, the less likely it becomes that someone would reproduce the work without the consent of the copyright owner.⁷³¹

⁷³⁰ With the advent of Internet and digital technologies, a series of legislative reforms have been implemented to extend the scope of copyright protection to the digital environment, while simultaneously ensuring that a proper balance is struck between the economic interests of right holders and public access to digital works. For more details on legislative reforms that the copyright regime has been subject to, see Part I. Chapter 1: Copyright Law. Section 2: Digital Challenges. Subsection A: Legislative Reforms.

⁷³¹ In the physical world, the provisions of copyright law are partially enforced by the physical properties of the tangible medium of expression into which a work has been incorporated. Given the costs of reproduction and redistribution of physical copies, the likelihood of copyright infringement is likely to be much lower in the physical than in the digital environment. For a broader

Most of the provisions of copyright law can therefore be regarded as being partially enforced by the properties of the physical medium.

Since the medium has become digital, however, the natural barriers against the reproduction and the dissemination of works no longer apply. Indeed, while the legal properties of a work are unlikely to vary according to whether it has been incorporated into a physical or a digital medium of expression, the physical characteristics of the medium necessarily depend upon the environment it subsists in. As a physical resource, a tangible medium of expression can be regarded as a private good - which is fundamentally scarce and rival in consumption. Conversely, in view of its intangible character, the digital medium is more likely to assume the characteristics of a public good - which is fundamentally non-rival - because the consumption of a work by one person does not preclude the consumption of the same work by others.⁷³²

In the physical world, the discrepancy between the physical properties of the medium (as a private good) and the legal properties of the work (as a public good) were partially reduced by copyright law, which effectively turned the work into a private good through the introduction of artificial scarcity.⁷³³ In the digital world, instead, given the properties of the digital medium, the copyright regime is in fact one of the main factors for the discrepancy that subsists between the legal properties of the work (as a private good) and the physical properties of the medium (as a public good). In view of this inconsistency, the self-regulating features of the copyright regime have progressively been fading away in the digital environment. The overall efficacy of copyright law has been significantly reduced and the level of copyright infringement has been considerably intensified.

Recent legislative reforms were expected to restore the self-regulating features of the copyright regime by analyzing the impact that the Internet and digital technologies had over the production and the consumption of digital works. In order to discourage copyright infringement, while nonetheless allowing for the deployment of these new technologies, the properties of the work should be realigned with the properties of the digital medium. Hence, either the work has to be converted back into a public good, or the medium has to be turned

overview of the self-regulating feature of copyright law, see Part I. Chapter 2: Private Regulation. Section 1: Self-Regulating Regime. Subsection A: In the Tangible Environment.

⁷³² Digital goods differ from other kinds of goods because they are non-rival. Given that copy of a digital good is in every aspect equivalent to the copy itself, the same good can be consumed simultaneously by many different users without affecting the consumption of others. Digital goods can also be regarded as non-excludible goods, to the extent that they are both aspatial - i.e. they are both nowhere and everywhere at the same time. After they have been released over the internet network, it becomes very difficult to exclude anyone from accessing the various copies of a digital work, unless the access or the consumption thereof have been restricted by technological means. For more details on the public good characteristics of digital goods, see e.g. QUAH, D. (2002) *Digital Goods and the New Economy*. *Centre for Economic Performance - Discussion Paper No. 3846*. London School of Economics.

⁷³³ In law and economics, copyright law is generally regarded as a solution the market failure resulting from the public good character of information. Yet, in order for a work to be traded on the market for information goods, there must be an object of trade. Although the physical medium qualifies as a proper commodity, the work it incorporates is however subject to a different set of properties that are ultimately incompatible with the market mechanism. In order to realign the properties of the work with the physical properties of the medium by which it is being conveyed to the public, copyright law turns the work into a private good by introducing a series of property rights over the expression of every original work of authorship for a limited period of time. Part I. Chapter 2: Private Regulation. Section 1: Self-Regulating Regime. Subsection A: In the Tangible Environment.

back into a private good. Yet, given the rapid pace at which technology evolves – as opposed to the speed of the legislative process – it is difficult for the law to be consistently and adequately reformed after every technological advance.⁷³⁴

To the extent that none of the legislative reforms adopted so far have actually succeeded in restoring the self-regulating features of the copyright regime, piracy has nowadays become ubiquitous in the digital world. Given the failure of the public sector in resolving the problem of copyright infringement, the issue has been addressed by the private sector in a variety of ways.

Even if they ultimately belong to the realm of intellectual property law, the legal properties of the work can theoretically be overwritten by contract. In line with the principles of freedom of contract, private parties can enter into specific contractual agreements in order to either reduce or increase the scope of protection that has been provided by default under the copyright regime. Regardless of the way in which it has been defined by the law, the work can therefore assume the characteristics of either a private or a public good according to the terms and conditions of the copyright license under which it has been released.⁷³⁵ Likewise, even if they are generally associated with the properties of a public good, the properties of the digital medium can be theoretically modified by technological means. The digital medium can therefore assume the characteristics of a private good by means of specifically designed technological measures of protection.

In particular, in the digital environment, private regulation came into play as an attempt to reintroduce the self-regulating features of the copyright regime by means of two divergent mechanisms.⁷³⁶

On the one hand, it has become common practice in the context of many commercial transactions to rely upon the use of restrictive licensing agreements and technological measures of protection for the distribution and dissemination of digital content. Today, many digital works are licensed under a variety of end-user licensing agreements whose terms and conditions precisely regulate the manner and the extent to which the work can be

⁷³⁴ A proper implementation of copyright law must necessarily account for the current technological framework of society. Important technological advances will thus require the law to be reformed in order to comply with the new technological framework that is emerging. In recent years, however, the pace of technological advances is too rapid to allow for the legislature to properly catch up with the many technological changes which are likely to affect the production and the consumption of copyright works. See Part II. Chapter 2: Private Regulation: Contracts. Section 2.A: Legislative Lag.

⁷³⁵ Different mechanisms of self-help have emerged in the digital world in order to restore the self-regulating features of the copyright regime. On the one hand, restrictive licensing agreements combined with technological measures of protection constitute an attempt to reintroduce the characteristics of a private good into the digital medium. For more details, see Part I. Chapter 3: Private Regulation: Technological Measures. On the other hand, extremely liberal licensing agreement such as most Open Content license constitute an attempt to reintroduce the characteristics of a public good into the expression of the work. For more details, see Part I. Chapter 4: Private Regulation: Open Content.

⁷³⁶ The inability of the copyright regime to address certain technological advances in a timely manner necessarily results in a certain degree of legal uncertainty over the application of copyright law into the new technological framework. The greater is the level of uncertainty for right-holders and users, the smaller will be the extent to which they actually rely upon the provisions of copyright law in order to regulate the access to and the consumption of content, and the greater their reliance upon private mechanisms of self-help will be. See DEPOORTER, B. (2009) Technology and Uncertainty: The Shaping Effect on Copyright Law. *University of Pennsylvania Law Review*, 157.

legitimately accessed and consumed. In order to ensure compliance with the provisions of the copyright license, its terms and conditions are often enforced by technological measures of protection to automatically prevent the unauthorized exploitation of the work. Endorsed by many powerful right-holders, the objective of this approach is to restore the self-regulating features of the copyright regime by turning the digital medium into a private good through a series of contractual and technological means.⁷³⁷

On the other hand, a very liberal set of licenses has been advanced by the Open Content community to embrace the nature of the digital environment. Inspired by the copyleft philosophy of the Open Source movement, the objective of these licenses is to reduce the default level of protection granted under copyright law in order to promote the broadest dissemination of works. Although they necessarily rely upon the provisions of the copyright regime in order to be enforceable against third parties, Open Content licenses are for the most part concerned with the free reproduction and the free dissemination of works.⁷³⁸ As such, they purport to re-establish the self-regulating features of the copyright regime by reintroducing into the work certain characteristics of a public good.

In spite of the divergence in methods, the commonality of these two approaches lies in their objectives. Both aim at re-establishing the self-regulating features of the copyright regime by re-aligning the legal properties of the work with the physical properties of the medium into which it inheres, so that they can be exchanged in the market for information goods as a single asset with a consistent set of properties.

As a general rule, every work of authorship can be incorporated into a series of different media - either physical or digital - which qualify as different instances of the work. Every one of these instances might subsequently be released under a variety of licensing agreements, whose terms and conditions ultimately determine the legal properties of that particular instance of the work.⁷³⁹ The provisions of the copyright license under which a work has been released do not affect the work as a whole, but only the properties of the particular copy of the work to which they refer.

⁷³⁷ As opposed to the physical environment, where information is for the most part regulated by the provisions of copyright law, in the digital environment, the private sector is assuming an increasingly relevant role in the regulation of information, whose consumption is fundamentally regulated by contractual agreements and technological measures of protections. For more details, see Part I. Chapter 2: Private Regulation: Contracts, and Chapter 3: Private Regulation: Technological Measures.

⁷³⁸ While many content providers believe that content in a digital format requires a greater level of protection, certain authors consider instead that the standard level of protection provided under the law is likely to limit the free reproduction and dissemination of their works. While the former are likely to rely on technological measures in order to expand the level of protection beyond the scope of the copyright regime, the latter are instead more likely to rely on Open Content licenses in order to reduce the default scope of protection granted under the copyright regime. For more details, see Part I. Chapter 2: Private Regulation, and, in particular, Chapter 3: Private Regulation: Technological Measures. and Chapter 4: Private Regulation: Open Content.

⁷³⁹ Copyright law grants authors with a series of exclusive rights over the expression of their works, which they can subsequently license or assign to third party according to the principle of freedom of contract. In particular, in the context of most end-user licensing agreements, every instance of a work can be released under a different set of terms and conditions which are specific to that particular copy of the work. For more information on the extent to which the owners of the copyright in a work are entitled to modify the default scope of protection granted under the law, see Part I. Chapter 2: Private Regulation. Section 2.B: Copyright as default rule.

As such, the notion of a copy necessarily plays an important role in defining the terms and conditions that regulate the exploitation of the different instances of a work. Before the legal status of a digital work can be properly established, it is therefore necessary to understand what constitutes the copy of a work in the digital environment.⁷⁴⁰

The problem is that, while it is relatively easy to identify the copy of a work in the physical world, establishing the identity of a digital copy is likely to be much harder. The difficulty resides in the fact that the concept of a ‘copy’ has not been expressly defined within the framework of copyright law. The meaning of the term must therefore be either (1) inferred from the various provisions that pertain to that particular body of law (inferential approach), or, alternatively, (2) defined according to a particular set of criteria that determine the way in which it has to be construed within the provisions of copyright law (ontological approach).⁷⁴¹

The research suggests that, since the provisions of the copyright regime employ the same terminology in order to refer to both a physical and a digital copy, a purely inferential approach is likely to fail in its intent to provide a proper definition of the term. The definition of a copy is in fact likely to change according to the context of analysis. To the extent that it is able to draw a distinction between the different meanings that the term might assume in the physical or in the digital environment, an ontological approach is likely to be preferred. Accordingly, in order to provide a definition that is consistent with the framework of copyright law, the solution adopted in the context of this research ultimately relies upon an ontological analysis of the constitutive elements of a work, whose definitions are, however, derived from an inferential understanding of the law.

While, in the first part of the thesis, the provisions of the copyright regime and the terms and conditions of different licensing agreements are thoroughly analyzed, in the second part of the thesis, these provisions are subsequently incorporated into a series of ontological frameworks in order to illustrate the manner and extent to which they relate to the constitutive elements of a work and to the concept of a ‘copy’. Finally, in the last part of the thesis, every constitutive element is brought under assessment in order to identify the one that is the most likely to qualify as a copy of the work for the purposes of the copyright regime.

In particular, for the purposes of this research, the scope of analysis has been limited to the FRBR and the IAO - two ontological frameworks which have been developed for different purposes and which are currently being employed in different fields of application. Even though, by default, neither the FRBR nor the IAO are able to

⁷⁴⁰ In the case of most end-user licensing agreements, users do not acquire the right to exploit the work as a generic entity, but only obtain the right to consume a particular copy of that work incorporated into a particular medium of expression – according to the terms and conditions specified under the copyright license. In order to identify the actual scope of their rights, end-users must therefore be provided with a mechanism to determine the scope of the copy that they have become the owners of – an operation which can be very challenging in the digital environment, to the extent that it is no longer possible to rely upon the physical characteristics of the medium of expression incorporating the work. For a better overview of the problems concerning the identification of a copy in the digital environment, see Part II. Chapter 11: The Identity of Digital Copies. Section 1: Definition of a Copy.

⁷⁴¹ The meaning of a legal concept can be determined (a) by inference, according to the meaning of the legal provisions, or (b) ontologically, according to a previously established definition. For more details on the distinction between inferentially defined concepts and ontologically defined terms, see SARTOR, G. (2009) *The Nature of Legal Concepts: Inferential Nodes and Ontological Categories*. *Artificial Intelligence and Law*, 17.

identify the copies of a work in the digital environment, their structure could nonetheless be extended with a series of entities that could help determine the scope and identity of a digital copy.

Originally conceived as a conceptual model for the description and identification of bibliographic records, the objective of the FRBR is to facilitate end-users in the process of retrieving different instances of a work according to a particular set of criteria. In order to do so, the terminology of the FRBR identifies the different elements of a work that may be relevant from a bibliographical standpoint. Even if it is usually employed in the context of literary works, the structure of the FRBR is sufficiently generic to apply to a variety of works of many different natures.⁷⁴² In contrast, the IAO was conceived as a particular branch of the OBI (Ontology for Biomedical Investigations) concerned with the identification and the description of information artifacts pertinent to the biomedical field. Yet, even if originally designed for that particular field of application, the structure of the IAO is sufficiently flexible to extend to a variety of information artifacts of different natures or types.⁷⁴³

Both ontological frameworks can therefore be employed to identify the constitutive elements of any original work of authorship, along with their distinctive qualities and attributes. Yet, the choice of one framework over the other ultimately depends upon the specific purpose of analysis and the particular objective to be achieved.

In a bibliographical context, for instance, users are interested in obtaining the copy of a work regardless of the identity of the copy itself. Although they may discriminate between different copies of the work on the basis of content (i.e. the way in which the work has been expressed), or form (i.e. the way in which it is being conveyed to the public), users are unlikely to distinguish one copy from the other on the basis of their physical characteristics.⁷⁴⁴ To the extent that it has been specifically designed for the description and identification of

⁷⁴² Developed under the auspice of the IFLA, the FRBR provides a particular terminology which is intended to be accepted as a general conceptual model to facilitate international standardization within the bibliographical universe. As such, the FRBR implements a generalized model which can refer to a bibliographical record at various levels of abstraction (i.e. the work, the expression, the manifestation, or the item) and at different levels of granularity (i.e. an aggregation of works, an individual work, or a particular component of a work). Accordingly, even if commonly employed in combination with works of a literary nature (e.g. books, journals, reports), the FRBR framework could potentially be applied to every type of materials. See TILLET, B. B. (2009) *International Cataloguing Principles (ICP) Report. World Library and Information Congress*. Milan, Italy. For a more general overview of the FRBR framework, see Part II. Chapter 7: The FRBR Approach.

⁷⁴³ The original purpose of the IAO was to provide a detailed ontological framework that would be able to support the OBI in the ontological analysis of documents, publications, articles, databases or any other information artifact that may represent the results of biomedical investigations. However, the scope of the IAO has been defined more generally so as to encompass any information artifact which has been produced by man or by a machine specifically designed for it (i.e. any artifact which is capable of conveying information but which has not been produced by nature). As such, the IAO may therefore be employed to carry on the ontological analysis of a variety of things, such as, e.g. documents, books, publications, journals, protocols, contracts, novels, maps, recipes, and so forth. More details concerning the scope and the architecture of the IAO can be found in Part II. Chapter 9: The IAO Approach. For a more detailed overview on the origin and the application of the IAO in various fields of endeavors, see e.g. http://neurocommons.org/page/Information_Artifact_Ontology

⁷⁴⁴ The role of the item is merely to convey one particular expression of the work according to a specific manifestation. Every item that incorporates the same manifestation and/or the same expression of the work will therefore be regarded as being fundamentally equivalent from the perspective of the user who is willing to consume that work. Users are unlikely to distinguish between different copies of a work - unless an item actually possesses a distinctive characteristic that makes it more valuable than the others (such as,

works at higher layers of abstraction, the FRBR framework is likely to be more appropriate than the IAO, which is exclusively concerned with the description and the identification of things that can be observed in reality.

From a legal perspective, instead, the ultimate object of analysis is likely to vary according to the license that is being taken into account. Indeed, to the extent that they can be indefinitely subdivided, the rights granted under a copyright license could theoretically be limited to a particular layer of abstraction (i.e. to the work_t, the expression_t, the manifestation_n, or a particular item_t of the work),⁷⁴⁵ and their scope could be further constrained according to the level of granularity to which they ultimately refer (i.e. to the work as a whole or only to one or more parts thereof).⁷⁴⁶

Accordingly, only an ontological framework capable of identifying the various aspects of a work at different levels of abstraction and at different degrees of granularity can succeed in describing the object of the rights that are being licensed. While both the IAO and the FRBR framework could theoretically achieve this task, their distinctive structure and characteristics are likely to affect their overall applicability according to the context of analysis.

For instance, in the context of most commercial agreements, the license is generally concerned with the rights vesting in the work_t, the expression_t, or the manifestation_t. Given that they have been expressly recognized within the FRBR framework as a series of separate entities with their own attributes and properties, the FRBR is likely to qualify as the preferred alternative to determine the object and scope of many commercial licenses.

Conversely, end-users licensing agreements (EULAs) are primarily designed to regulate the way in which a particular copy of the work can be legitimately accessed, used, consumed, or otherwise disposed of. In this regard, the range of application for every licensing agreement can only be determined by establishing the scope

e.g. an autograph of the author) or perhaps less valuable to the extent that it has been subject to a certain degree of changes after it has been produced (e.g. if the item has subsequently been damaged). See YEE, M. M. (2008) *Cataloguing Rules*. Los Angeles, USA, University of California UCLA.

⁷⁴⁵ Copyright law protects the expression of any work of authorship against the unauthorized exploitation thereof. While the copyright only vest in the expression of a work, and not on the underlying ideas of the work, in view of the principle of non-literal copying, copyright protection may sometimes extend beyond the scope of a particular expression and consequently apply also to the work as a general concept. Besides, while certain jurisdictions offer an additional layer of protection to the different manifestations of a work, the exploitation of both the manifestation and the item are generally protected by virtue of the fact that they incorporate a particular expression of the work. For more details on the different levels of protection granted to the various aspects of a work under the copyright regime in various jurisdictions, see *supra* Part I. Chapter 1: Copyright Law. Section 1: Copyright basics.

⁷⁴⁶ The principle of divisibility of copyright rights recognizes the fact that the copyright basically amounts to a collection of individual rights which can be severed indefinitely into a series of smaller individual rights. Not only can the exclusive rights granted under copyright law be transferred separately, but they can also be further subdivided into a series of more limited rights which can in turn be transferred independently. As such, rights may be granted at different levels of abstraction and at different levels of granularity (i.e. to the work as a general concept, to a particular expression of the work, to only a particular element thereof, or to that particular section presented into a specific format, etc). For a more general overview, see e.g. GROFFMAN, E. (1979) *Divisibility of Copyright: Its Application and Effect*. *Santa Clara Law Review*, 19.

of the copy to which it ultimately refers. To the extent that they are both able to identify the copy of a physical work, the IAO and the FRBR can be used interchangeably in the physical world. Yet, in view of the malleability of digital media and the inherent mutability of digital content, identifying the copy of a work in the digital environment is likely to be challenging for either of them.

Although, in the physical environment, the *item_t* (in the FRBR sense) can be regarded as a particular copy of the work, in the digital world, the *item_t* does not accurately define the scope of a digital copy. Yet, since none of the entities identified by the FRBR can properly represent the copy of a digital work, the framework should eventually be revised to better comply with the specificities of the digital world. The problem is that, to the extent that every entity must necessarily subsist within one particular layer of abstraction, the structure of the FRBR is fundamentally too rigid to allow for the introduction of a new entity that properly represents the copy of a work in the digital environment.⁷⁴⁷

As opposed to the FRBR, the IAO adopted a realist approach where every term of the ontology necessarily refers to an entity that can be observed in the real world. As a result, the IAO is unable to identify the constitutive elements of a work that subsists at higher levels of abstraction.⁷⁴⁸ Yet, one important advantage of the IAO over the FRBR is that its basic structure can be extended with a series of arbitrarily defined classes. The terminology of the FRBR could therefore be imported into the framework of the IAO⁷⁴⁹ to properly identify the object and scope of the rights licensed under many commercial copyright licenses. However, just as the *item_t* (as defined within the FRBR) is unable to identify the copy of a work in the digital environment, so is the information bearer (as defined within the IAO) equally unable to fulfill that purpose.

⁷⁴⁷ The structure of the FRBR is a taxonomy in which every node may have an indefinite number of children at the lower level of abstraction but only one parent at the higher level of abstraction. While it is theoretically possible to introduce new entities into the structure, these entities must however to be inserted within a particular layer of abstraction and cannot as such encompass different entities that subsist at different levels of abstraction. Yet, in view of the specificities of the digital medium, the copy of a digital work cannot be situated into one particular layer of abstraction, given that it may include a series of entities that pertain to different levels of abstraction, while nonetheless distinguishing between these entities on a series of other grounds, in spite of them being identical on a particular layer of abstraction. For more details, see *supra* Part II. Chapter 12: Digital Copies in the FRBR. Section 2: Problems with the FRBR Framework.

⁷⁴⁸ The structure of the IAO is based upon the principles of the BFO, according to which the main function of an ontology is to reflect the physical world in the most objective way. See SPEAR, A. D. *Ontology for the Twenty First Century: An Introduction with Recommendations*. Saarbrücken, Germany, Institute for Formal Ontology and Medical Information Science. Being more closely connected to reality than the FRBR, the IAO is likely to be more suitable to describe the various entities that subsist at the physical level of abstraction, but is however likely to fail in describing these entities that subsist at any higher level of abstraction. For a more detailed overview of the scope and the structure of the IAO, see *supra* Part II. Chapter 9: The IAO Approach. Section 1: Scope of the IAO, and Section 2: The IAO Architecture.

⁷⁴⁹ The structure of the IAO can be extended by means of specifically defined classes designed to include a particular set of entities that share a particular set of characteristics. To the extent that they can be described through a series of criteria that determine whether or not an entity can be regarded as a particular member of the class, the traditional entities identified by the FRBR can be incorporated within the framework of the IAO in the form of a class. See Part II. Chapter 9: The IAO Approach. Section 4: Relationship with the FRBR.

The definition assigned to the copy in the physical environment is therefore unable to properly represent the notion of a digital copy. Instead of trying to incorporate two concepts into a single definition, the approach suggested by the research is rather to distinguish between the different meanings assumed by this term according to whether it refers to a physical or a digital copy.

In this respect, one of the main contributions of this research is to provide a new definition for the notion of a ‘copy’ within the framework of copyright law. The basic claim is that the concept of a copy is ultimately a social construct whose definition necessarily differs according to whether it is being assessed in the physical or in the digital world.⁷⁵⁰ To the extent that the physical properties of the medium no longer constitute an accurate criterion for determining the identity of a copy, a different set of criteria should be taken into account. In particular, if the scope of a digital copy cannot be established by means of its physical attributes, it must necessarily be determined through an alternative set of objective and recognizable criteria.

The solution proposed in the research is that, in the digital world, the terms and conditions of every end-user licensing agreement ultimately determine the identity of every individual copy of the work. Hence, as opposed to the physical world, where the scope of a license is determined by the physical boundaries of the copy to which it refers, in the digital environment, the scope of a copy is ultimately determined by the provisions of the copyright license under which it has been released.⁷⁵¹

The particularity of this approach is that, to the extent that they fulfill every relevant formal and legal constraint,⁷⁵² and provided that they have been released to the same user or to the same category of users,⁷⁵³

⁷⁵⁰ As opposed to tangible entities, whose identity is determined by the form they assume in the physical world, the majority of legal concepts ultimately qualify as a series of social constructs which cannot be observed in the real world. Their identity is therefore determined by the meaning they have been assigned by society. Given their artificial character, the same concept may sometimes be assigned a different definition in different contexts of analysis. For more details on the extent to which the meaning of a legal concept depends upon the way in which it has been defined by society, See Part II. Chapter 11: The Identity of Digital Copies. Section 1.B: The Copy as a Social Construct.

⁷⁵¹ End-user licensing agreements determine the manner and extent to which any given copy of a work can be legitimately accessed or consumed. To the extent that one determines the scope of the other, there exists a significant relationship between the copy of a work and the copyright license under which it has been released. Yet, the direction of this relationship ultimately depends upon whether it involves a physical or a digital copy. While the scope of a physical copy determines the range of application of any end-user licensing agreement, the scope of a digital copy is itself determined by the terms and conditions of the copyright license under which it has been released. The reason is that, while, in the physical environment, it is relatively easy to identify the scope of a copy according to its physical characteristics, in the digital environment, the scope of a digital copy cannot be established according to any of its physical or digital characteristics, but only according to the way in which it can be experienced by end-users – which ultimately depends upon the terms and conditions of the copyright license under which it has been released. For more details on the establishing the identity of a digital copy, see Part II. Chapter 11: The Identity of Digital Copies. Section 1.3: The Scope of a Digital Copy.

⁷⁵² According to the suggested approach, the copy of a digital work can be identified according to a series of criteria which represents the formal requirements (i.e. the way in which the work is represented in the digital world - in terms of format, quality, or style) and the legal constraint (i.e. the way in which the work can actually be experienced in the digital world - in terms of permissions, restrictions, or obligations) which have been introduced by the copyright owner when that particular copy of the work has been released to the public. See Part II. Chapter 13: Digital Copies under the IAO. Section 2.A: Identity criteria.

⁷⁵³ While the copy of a work is capable of multiple instantiations, the various instances thereof must necessarily be related to each others by virtue of the fact that they have been released under a license that is addressed to the same user or category of users.

different instances of a work might qualify as the same copy of the work. As such, the copy of a work in the digital environment no longer qualifies as a token, but rather as a type which is capable of multiple instantiations.⁷⁵⁴

Derived from the area of linguistics, the idea is that, according to the context of analysis, the ‘copy’ of a work is a term which can be regarded either as a count noun (i.e. as a token which can be identified as a particular instance of the work) or as a mass noun (i.e. as a generic term which can be instantiated into a variety of entities that do not distinguish themselves from each other). Although, in the physical world, the copy of a work necessarily constitutes a single instantiation of the work, in the digital world, the copy of a work is a more general concept which fundamentally encompasses every instance of the work that satisfies the necessary legal and formal requirements. Accordingly, while the scope of a physical copy ultimately depends upon the physical boundaries of the medium into which they inhere, the scope of a digital copy is ultimately determined by the terms and conditions of the copyright license under which it has been released.

In spite of the complications,⁷⁵⁵ this dual approach is likely to facilitate the identification and the consumption of works in both the physical and the digital environment. Indeed, assigning different meanings to the concept of a copy is likely to produce a more consistent framework of analysis, allowing for an easier identification and a better representation of physical and digital copies.

To conclude, given that, in the digital environment, a copy can inhere into more than one medium at a time, a mechanism is needed in order to distinguish between the different instances of a work according to whether or not they belong to the same copy. Yet, the conditions under which any given instance of the work can be regarded as a particular copy thereof are often difficult to determine, since they depend upon a series of criteria that are independent from their physical or digital representation. To address this problem, the last section of the thesis suggests a preliminary mechanism of identification, implemented in the form of an

Different instances of a work which have not been released to the same group of users will not qualify as the same copy of the work in spite of their similarity in terms of digital representation. See Part II. Chapter 13: Digital Copies under the IAO. Section 2.B: User Identity.

⁷⁵⁴ Within the IAO framework, a defined class is an entity that fundamentally acts as a container in the sense that it basically gathers various entities together according to a series of criteria which have been arbitrarily defined. Every entity that fulfills all of the established criteria can be regarded as a member of the class, regardless of its nature or kind. A defined class is therefore not limited to one particular level of abstraction, given that it can encompass a number of entities from a variety of different levels. In this regard, every digital copy constitutes a new class that refers to all the different information bearers which actually incorporates that particular copy of the work at a particular moment in time. As such, the population of the entity is likely to change over time, as the copy is transferred from one place to another, as it is converted from format to the other, or as it is being legitimately reproduced. For more details, see *supra* Part II. Chapter 13: Digital Copies under the IAO.

⁷⁵⁵ Identifying the copies of a digital work is complicated because it is not possible to determine the scope of a digital copy by relying upon the physical properties of the copy itself. In the digital environment, the copy of a work can in fact retain its identity over time in spite of the changes that may incur in the physical or digital representation thereof. As opposed to the physical world, where every copy represents a single instance of the work which distinguishes itself from the others on the basis on its physical attributes, in the digital world, the copy of a work can be instantiated into different media which may assume different physical and/or digital representations. For a broader analysis of the problems related to the identification of digital copies, see Part II. Chapter 11: The Identity of Digital Copies.

integrated framework for metadata, combined with a system of unique identifiers.⁷⁵⁶ By incorporating the identity of the user(s), as well as every formal and legal constraint that contribute to defining the scope of the copy into a proper system of metadata, it becomes possible to determine whether or not the different instances of the work actually satisfy those criteria and whether they should therefore be assigned the same unique ID.

The advantage of the system is that it significantly reduces the complexity of the procedure that users should otherwise carry out to assess the legitimacy of their actions. Given that the scope of a digital copy is directly derived from the terms and conditions of the copyright license under which it has been released, users are protected against liability for copyright infringement as long as they do not attempt to access or reproduce a copy other than the one they have legitimately acquired.

In addition, by assigning a different definition to the concept of a ‘copy’ according to the context of analysis, it becomes possible to benefit from the new opportunities of digital technologies, without incurring the risk of jeopardizing the regulation of information in the physical world. Even though, in the physical realm, a single physical item is generally satisfactory for most types of consumption, in the digital world, a large number of items might be necessary to perform what is commonly considered a single act of consumption. Limiting the concept of a ‘digital copy’ to one physical instance of a work is therefore likely to be excessively restrictive, unless a series of legislative reforms are implemented (with the unavoidable risk of modifying the status quo in the physical world).

Given their distinctive attributes and characteristics, physical and digital media cannot be regulated exactly in the same way. Instead of changing the legal rules, the proposed solution consists of assigning alternative definitions to the concepts the law refers to, so that the same goals can be achieved within the same body of law. In order for the self-regulating features of the copyright regime to be simultaneously achieved in the physical and digital world, it is necessary to distinguish between physical and digital copies according to their nature and scope.

⁷⁵⁶ Given that the copy of a digital work is a type that is capable of multiple instantiations, the problem is to identify a proper mechanism to determine whether or not a particular instance of the work can actually be regarded as a particular copy thereof. For a preliminary solution to this problem, see Part II. Chapter 11: The Identity of Digital Copies. Section 1: Definition of a Copy, and, in particular, Chapter 14: Practical Implementation, Section 1: Unique Identifier and Section 2: Metadata.

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