

Code, Access to Knowledge and the Law: The Governance of Knowledge in the Digital Age

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THIS PAPER ENDEAVOURS TO CLARIFY THE ROLE OF TECHNOLOGY in the governance of knowledge in the networked information society. Its central argument is that modern technologies of control, deployed as they are by powerful actors, tend to exclude indiscriminately access to knowledge, and, as a result, impede the dramatic potential of the digital age. While exploring the above thesis, the patterns of interrelation between code and the law and their influence on the networked information society are examined. The author argues that the existing equilibrium between control and A2K is disproportionately disposed toward specific private interests, originating primarily from the powerful market players of traditional industrial sectors, while generally disregarding other private interests, or indeed the interest of the public as a whole. The paper concludes by calling for more equitable and balanced equilibria between control and A2K, implemented in a model of governance more clearly orientated towards social and economic development.

DANS CE TEXTE, ON CHERCHE À CLARIFIER LE RÔLE DE LA TECHNOLOGIE dans la gouvernance du savoir au sein d'une société d'information en réseau. Selon son argument principal, les technologies de contrôle modernes, déployées comme elles le sont actuellement par de puissants acteurs, tendent à exclure de façon arbitraire l'accès au savoir, et empêchent par conséquent le développement prodigieux de l'ère numérique. Tout en explorant la thèse susmentionnée, on examine également les schémas de l'interrelation entre le code et le droit et leur influence sur la société d'information en réseau. L'auteur soutient que l'équilibre existant entre le contrôle et l'accès aux connaissances penche de façon disproportionnée vers des intérêts privés spécifiques, qui appartiennent principalement à de puissants intervenants sur le marché des secteurs industriels traditionnels, au détriment d'autres intérêts de nature privée, ou des intérêts du public dans son ensemble. L'auteur conclut son texte en réclamant l'instauration d'un équilibre plus équitable entre le contrôle et l'accès aux connaissances dans le cadre d'un modèle de gouvernance plus clairement orienté vers le développement socioéconomique.

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It is remarkable to note how long mankind was able to carry on without any knowledge organization whatever... To the people of the Age of Frustration our interlocking research, digest, discussion, verification, notification and informative organizations, our Fundamental Knowledge System, that is, with its special stations everywhere... would have seemed incredibly vast... We are still enlarging this Brain of Mankind, still increasing its cells, extending its records and making its interactions more rapid and effective.

– HG Wells, *The Shape of Things to Come* ¹

1. PROLOGUE

HUMAN SOCIETIES ARE GOING THROUGH A PERIOD OF RAPID and deep transformation in terms of economy and structure. Information, knowledge and culture² are gradually replacing material goods as the main generators of wealth and power in our age and, as a result, are becoming fundamental facets of productivity. Networked models of organization are also employed by various actors to replace existing organizational structures and to guarantee efficiency and flexibility in an increasingly globalized environment. At the heart of the change lies the impetuous advance of information and communication technologies, which revolutionize all aspects of human activity. What has been called “the digital age” is an era of unprecedented potential for social and economic development, and humanity is only at its threshold.

The networked information society³ is still in its infancy, with its structures, rules and functions subject to constant change. Different actors representing divergent interests, originating mainly from states, markets or society,⁴ compete in the creation of often-conflicting ideological, socio-political and regulatory currents, in the contest to define the identity of the networked world. Whilst the ultimate goal is dominance of the new environment, the emerging dispute concerns the governance of knowledge as the principal capital

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1. HG Wells, *The Shape of Things to Come* (Macmillan, 1933), <<http://etext.library.adelaide.edu.au/w/wells/hg/w45th/chapter15.html>> at pp. 129–130.
 2. Information has always been crucial for the development of human societies and was always perceived as the gateway to knowledge and culture. Nevertheless, modern information technology has, to a large extent, punctuated the transformation of information into intellectual or cultural creation, leveraging its importance as a result. Therefore, the capacity of modern technology for the aggregation and processing of information render accessibility a prerequisite for social and economic development in our age.
 3. The term “networked information society” aims to describe the rapid transformations in society and economy that result from our increasing dependence upon information as a source of wealth, with decentralized electronic networks as the medium of its conveyance.
 4. The crude classification of competing forces in the formulation of the networked information society into these vague categories is over-simplistic and obviously limited. However, it is helpful in identifying the nature of power accumulation in the new environment and the character of these colliding interests.

and source of wealth and power of our times. Traditional policies of governing knowledge in the tangible world are essentially based on law, in particular intellectual property law, created and enforced within societies and markets by states. But in the networked information environment, the main tool of governance, which provides its controller great power, is the technology that commands its architecture and function. The traditional analogies of power between states, private market actors and society appear thus to shift in the new arena in favour of the controllers of that technology. And the emergent equilibrium of power relations is to finally define the future form of our interconnected, networked world. The question, however, is not only one of power and control, but of whether the applied models of knowledge governance take advantage of the potential of the digital age for social and economic development, and, of course, how to maximize that advantage.

The whole debate about the governance of knowledge through technology is centralized upon the interrelation between two key elements: code and law. The term "code" pertains to the technologies managing network content and the technologies giving structure to the networked information environment, the current leaders being Digital Rights Management (DRM) and Trusted Computing (TC) systems. "Law" mainly refers to the field of intellectual property, particularly copyright,⁵ and the relatively new field of anti-circumvention legislation. These two key elements can be utilized either in order to exert control or in order to facilitate access to knowledge (A2K). Patterns governing knowledge in the digital age are characterized according to the balance that they maintain between control and A2K, and according to the forms and degrees of interrelation they formulate between code and law. It is this sensitive balance which determines how knowledge is governed in a specific time and place, thereby influencing the formation of the networked information society.

This paper endeavours to clarify the role of technology in the governance of knowledge in the networked information society. Its central argument is that modern technologies of control, deployed as they are by powerful actors, tend to indiscriminately exclude access to knowledge, and, as a result, impede the dramatic potential of the digital age. To support the above thesis, I examine the patterns of interrelation between code and law, and their influence on the networked information society. I further argue that the existing equilibrium between control and A2K is disproportionately disposed toward specific private interests, originating primarily from powerful market players of traditional industrial sectors, while generally disregarding other private interests, or indeed the interest of the public as a whole. The paper concludes by calling for more equitable and balanced equilibria between control and A2K, implemented in a model of governance more clearly orientated towards social and economic development. Our times demand a change of attitude in order to fully exploit the potential of the networked information society and grasp this remarkable historical opportunity for the flourishing of humanity; an opportunity that cannot be allowed to pass.

5. Whilst patent and trademark law are also relevant in the context of the current analysis, this paper will focus solely on issues arising from copyright.

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2. CODE, A2K AND THE LAW

THE EMERGENCE OF THE NETWORKED INFORMATION society has led to the evolution of two divergent currents: control on the one hand, and A2K, on the other. To begin, the legal response to the new era has formed a distinct current of control, characterized by an unprecedented expansion of intellectual property and, in particular, copyright protection. In the same respect, technology has subsequently been seen as a more appropriate way to protect network content, thereby aiming to alter the code and architecture of the space and introduce further legislative changes. The aforementioned currents are steadily orientated towards a one-dimensional attempt to increase control on information, knowledge and culture and, in so doing, move the identity of the networked information society in more restrictive directions.

Relatively recently, a loose but growing coalition of governments, private actors and NGOs, all concerned about the phenomenon of increasing control on information, knowledge and culture either by code or law and its compound effects on societies, economies and the networked world, have found common ground in the A2K concept and have managed to raise a more articulate voice in the political arena. This current aims to re-establish attenuating public interest principles in code and law, and reconsider the patterns which govern knowledge in the digital age.

These currents are not to be examined separately, but instead together with respect to the intertwined relations and constant interaction between code and law. Analysis and conciliation of their intellectual frameworks should also be oriented toward the construction of an efficient model for the governance of knowledge. Such an intellectual task cannot be properly fulfilled without a clear, established picture of the object of analysis: namely, the networked information environment and its nature, particularities and potential.

2.1. The Potential of the Networked Information Society

The networked world is the child of the technological revolution. This revolution, which commenced with the invention of the microprocessor chip, was significantly broadened by the development of information and communication technologies (ICT) and was dispersed amongst the masses with the introduction of the personal computer. The internet and the world wide web have come to be seen as the peak of the phenomenon, but they are in fact only precursors to a series of dazzling innovations to come.⁶

The potential of the networked information society lies in its architecture, which defines it. The architects that constructed the environment were well aware of the significance of their architecture, and therefore wanted to make it as functional, simple and neutral as possible. To achieve this, they designed its

6. "There will be just as few new major technologies in the next 20 years as in the past 20 years, but the number of ways ICT can be combined and used will increase significantly": David Cleevely, "What can technology tell us about the next 20 years?" in Victor Ayeni and Gerald Milward-Oliver, eds., *Maitland + 20: Fixing the Missing Link* (The Anima Centre, 2005) 217–228 at p. 221.

organizational structure based on the concept of a network of interconnected and interdependent nodes and hubs with minor hierarchical connection between them.⁷ It could be argued that any structure other than that of a mainly horizontal, decentralized network would be inappropriate for a truly functional global communications medium. Furthermore, simplicity was attained through the implementation of the end-to-end principle. The philosophy of the end-to-end principle is a straightforward one: keep the network as simple as possible and push its intelligence only to peripheral nodes.⁸ The simplicity of the system comes as a surprising antithesis to the complex functions it is capable of performing. But it should not be, for it is this simplicity and flexibility of space which allows for the accommodation of technological complexity in upper layers. In addition, the structural function of conveying information via a loose packet-based system, regardless of the packet content, results in the neutrality of the network and its capacity to accommodate all possible kinds of content or technology. Other central architectural features of the space are largely connected to its attitude towards the inhabitants of the networked world: that is, concurrent many-to-many communication, capacity of unconstrained peer interaction, peer equality and relative anonymity. It follows that the networked information environment has been designed through strict adherence to the objective of providing a functional communications medium, while other more complicated and controversial policy objectives, such as user accountability, rule enforcing and hierarchical control, were not addressed.⁹ As an Internet Architecture Board paper concisely summarized, "the goal is connectivity, the tool is the Internet Protocol, and the intelligence is end to end rather than hidden in the network."¹⁰ The result is the internet, a global communications network with no precedent in terms of its reach, incorporating the unique advantage of a many-to-many

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7. For an analysis of the networked characteristics of the environment and their potential, see Manuel Castells' *Information Age: Economy, Society and Culture* trilogy: Vol. I, *The Rise of the Network Society* (Blackwell Publishers, 2000); Vol. II, *The Power of Identity* (Blackwell Publishing, 2004); Vol. III, *End of Millennium* (Blackwell Publishing, 2000). It is also claimed that the decentralized structure of the networked information environment is growing in precedence within the material world and tends to pervade in societies and economies. Information and communication technologies make it possible for the networked form of organization to outperform centralized structures in efficiency, and correspond to the levels of flexibility that our globalized world commands. See Manuel Castells, "Information Technology, Globalisation and Social Development," No. 114, *UNRISD Discussion Paper* (United Nations Research Institute For Social Development," September 1999), <[http://www.unrisd.org/unrisd/website/document.nsf/ab82a6805797760f80256b4f005da1ab/f270e0c066f3de7780256b67005b728c/\\$FILE/dp114.pdf](http://www.unrisd.org/unrisd/website/document.nsf/ab82a6805797760f80256b4f005da1ab/f270e0c066f3de7780256b67005b728c/$FILE/dp114.pdf)>.
 8. JH Saltzer, DP Reed, and DD Clark, "End-To-End Arguments in System Design," (1984) 2:4 *ACM Transactions on Computer Systems (TOCS)* 277–288, <<http://web.mit.edu/Saltzer/www/publications/endtoend/endtoend.pdf>>.
 9. This architectural choice is not coincidental. It is grounded on a then widespread and still prevalent belief in the internet technology community over the relation between technology and politics. Avri Doria writes, describing the current status of this belief: "[i]t is an often quoted belief in the Internet technical community that political considerations are overcoming technical considerations and that this is a very bad trend. [...] This is seen as a serious problem because one of the principle tenets of many Internet technologists is that only by the unfettered progress of technology can the Internet thrive and meet its mission of a universal Internet for all. There is also a belief among many that the Internet is a new phenomenon that has grown into the force it has been because of the absence of political influence." Avri Doria, "WSIS, WGIG, Technology and Technologists," in William J Drake, ed., *Reforming Internet Governance: Perspectives from the Working Group on Internet Governance (WGIG)*, (The United Nations Information and Communication Technologies Task Force, 2005) 41–46, <http://www.wgig.org/docs/book/WGIG_book.pdf> at p. 44. Despite their underlying extreme thesis that politics altogether should not have any say on the shaping of technology, such beliefs have a certain prudence and should be translated in the policy-making field by a strict commitment to the principle of deregulation.
 10. Brian Carpenter, ed., *Architectural Principles of the Internet*, Internet Architecture Board (June 1996), <<http://www.ietf.org/rfc/rfc1958.txt>> at p. 1.

interactive communication between its users.¹¹

But what is actually unique in the phenomenon? Although superficially neutral,¹² the technologies that form the structure of the space enable human communication, interaction and information-sharing at an unprecedented level and without “real world” restrictions. Until now, the networked structure, simplicity, neutrality and peer principles have characterized the architecture and code of the networked world. In this sense, they empower freedom and consequently form the ideal basis for human creativity. If Yochai Benkler’s “layer” division of the networked information environment¹³ is adopted, then it could be claimed that these technologies of freedom governing the logical “layer” of the environment guarantee an innovation commons in its content “layer.” As Lawrence Lessig puts it, “[b]uilt on a platform that is controlled, the protocols of the Internet have erected a free space of innovation.”¹⁴ It is these technologies of freedom that unleash human creativity, thereby creating unparalleled opportunities for social and economic development.

Where there is more freedom, eventually there will be less control. After all, architecture is primarily politics, always bound to raise major political issues about freedom and control of activity in its relevant environment.¹⁵ The networked information environment is admittedly not safe or stable enough for adequate encouragement of business. It creates certain dangers for industries that commercially distribute content through the net. In particular, the capacity of information technology to facilitate the reproduction of digitized information at no cost and without loss of quality, together with the capacity of the global communications network to unrestrainedly disseminate content, renders the protection of information in the networked information society extremely problematic. In addition, its networked structure, anonymity and spatial and temporal particularities significantly inhibit policing and law enforcement. Some claim that the networked world has a tendency to create darknets of unauthorized content distribution and keep them beyond the reach of traditional law.¹⁶ In the race to commercial exploitation of the new environment, piracy has been declared the number one threat by content industries, who have made its eradication their

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11. As Dan Gillmore notes: “In the past 150 years we’ve essentially had two distinct means of communication: one-to-many (books, newspapers, radio, and TV) and one-to-one (letters, telegraph, and telephone). The Internet, for the first time, gives us many-to-many and few-to-few communications.” Dan Gillmore, *We The Media: Grassroots Journalism by the People, for the People* (O’Reilly Media, 2004), <<http://www.oreilly.com/catalog/wemedia/book/index.csp>> at p. 26.
 12. The relation between technology and society and its alleged neutrality has been vividly illustrated by Kranzberg in his well-known aphorism: “Technology is neither good nor bad, nor is it neutral.” implying the underlying potential of every technological innovation to evolve towards specific directions. Melvin Kranzberg, “The Information Age: Evolution or Revolution?” in Bruce R Guile, ed., *Information Technologies and Social Transformation* (National Academy Press, 1985) 35–53, <<http://www.nap.edu/catalog/166.html#toc>> at p. 50.
 13. Benkler’s “layer” division of the networked information environment systemizes its functions into a physical, logical and content layer (see Yochai Benkler, “From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access,” (2000) 52 *Federal Communications Law Journal* 561–579, <<http://www.law.indiana.edu/fclj/pubs/v52/no3/benkler1.pdf>>).
 14. Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (Vintage Books, 2002) at p. 26.
 15. See Mitch Kapor, “Architecture is Politics (and Politics is Architecture),” blog posting to *Mitch Kapor’s Blog* (23 April 2006), <<http://blog.kapor.com/?p=29>>.
 16. For further analysis on the concept of darknets, see Peter Biddle, Paul England, Markus Peinado and Brian Willman, “The Darknet and the Future of Content Distribution,” in Joan Feigenbaum, *Digital Rights Management* (Springer, 2003) 155–176, <<http://msl1.mit.edu/ESD10/docs/darknet5.pdf>> [Biddle, England, Peinado and Willman, *The Darknet*].

number one priority.¹⁷ This pressure has given rise to the currents of control in law and code.

2.2. Law: The Expansionist Current

The advent of the networked world has paved the way for an unprecedented expansion of copyright law. Facing the unlimited copying potential of the new environment, the consequent rise of unauthorized duplication of protected works, and under the pressure of the powerful content industry, legislators and policy makers at national and international levels have worked together to dramatically increase protection over intellectual creations based on the argument that digital is different.

The expansionist current in copyright law is not new, but its greatest development took place over the course of the 20th century. The most significant moments of expansion have taken place when new technologies were changing both the landscape of intellectual creativity and its means of dissemination. Since its official introduction in law with the enactment of the *Statute of Anne* (England, 1710)¹⁸ and its internationalization with the adoption of the *Berne Convention*,¹⁹ copyright law has expanded both in scope and duration in order to correspond to the changes introduced by new technologies like photography, phonography, film, broadcasting, reprography and video recording. In the digital age, the duration of copyright has been further prolonged, its scope expanded and its limits and exceptions eroded.

In the international political arena, the new era commenced with the TRIPS agreement,²⁰ the single most important document for the construction of a globalized marketplace of ideas. Under the aegis of the World Trade Organization (WTO) and through its powerful enforcement mechanism, TRIPS sets the minimum standards for copyright and harmonized divergent national legal systems on a global level. Nevertheless, as a result of harsh lobbying by the knowledge industries,²¹ TRIPS has been criticized for its tendency towards unfair redistribution of wealth from the poor South to the rich North, and its imposition of a coercive intellectual property (IP) regime on nations without regard to the divergences in local societies and economies.²² Yet, critics still considered the strict IP regime in TRIPS an inadequate response to the popularization of the

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17. Due consideration must be paid to the question of whether piracy functions as a pretext or as a means to promote other objectives in the raging crusade of the old to suppress and stifle the new. After all, piracy is only one aspect of the multifaceted struggle for the governance of knowledge and for dominance in the networked information society (see Section 3.3).
 18. *An Act for the Encouragement of Learning by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies (Statute of Anne)*, 8 Anne, ch. 19 (enacted 1710), available at *Project Avalon*, <http://www.yale.edu/lawweb/avalon/eurodocs/anne_1710.htm> [Statute of Anne].
 19. *Berne Convention for the Protection of Literary and Artistic Works* (9 September 1886, last revised in Paris 24 July 1971, and amended 28 September 1979), <http://www.wipo.int/treaties/en/ip/berne/trtdocs_wo001.html>, 828 *United Nations Treaty Series* 222.
 20. *Agreement on Trade-Related Aspects of Intellectual Property Rights* (15 April 1994) in *Agreement Establishing the World Trade Organization, Annex 1C*, <http://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm>, 1869 *United Nations Treaty Series* 299, (1993) 33 *International Legal Materials* 81 [TRIPS Agreement].
 21. See Peter Drahos and John Braithwaite, *Information Feudalism: Who owns the Knowledge Economy?* (Earthscan, 2002) at pp. 90–93, 110, 160 [Drahos and Braithwaite, *Information Feudalism*].
 22. See Arvind Panagariya, "TRIPs and the WTO: An Uneasy Marriage," <<http://www.bsos.umd.edu/econ/Panagariya/song/tripswto2.pdf>>. See also, Drahos and Braithwaite, *Information Feudalism*, *supra* note 21 at pp. 10–13.

internet and the growing pervasiveness of digital technology. New protections were introduced shortly after its adoption. The WIPO *Copyright Treaty* (WCT) and *World Performances and Phonograms Treaty* (WPPT)²³ significantly expanded the law by legislating a new exclusive public right of communication and by introducing the new field of anti-circumvention law. Since then, harmonization and additional expansions have continued to take place through the negotiation of bilateral or multilateral treaties,²⁴ albeit to a lesser extent. It appears, however, that the tide of copyright expansionism is heading for higher levels of protection in the networked information environment, a tide manifest, for instance, in WIPO's intention to adopt its *Treaty on the Protection of Broadcasting Organizations*. This will potentially grant a new exclusive neighbouring right to broadcasters and extensively reform the networked world.²⁵

These international developments have been underpinned by, as well as originated from, the strengthening of copyright law in economically powerful nations, which also happen to be the major exporters of intellectual works. In the USA and the European Union, for example, the lifespan of this protection has recently been extended by twenty years,²⁶ almost reaching perpetuity.²⁷ Furthermore, two new subject matters have been brought under the auspices of the law, namely computer programs²⁸ and databases.²⁹ Traditional exceptions to copyright law have been tightened or declared

23. WIPO *Copyright Treaty* (20 December 1996), <http://www.wipo.int/treaties/en/ip/wct/trtdocs_wo033.html> (entry into force 6 March 2002) [WCT]; WIPO *Performances and Phonograms Treaty* (20 December 1996), <http://www.wipo.int/export/sites/www/treaties/en/ip/wppt/pdf/trtdocs_wo034.pdf> (entry into force 20 May 2002) [WPPT].
24. For example, see relevant IP law articles of the multilateral draft *Free Trade Area of the Americas Agreement* (Third Draft, 21 November 2003), <http://www.ftaa-alca.org/FTAADraft03/ChapterXX_e.asp> [FTAA]; *The Central America–Dominican Republic–USA Free Trade Agreement* (5 August 2004), <http://www.ustr.gov/Trade_Agreements/Bilateral/CAFTA/CAFTA-DR_Final_Texts/Section_Index.html> (entry into force 1 March 2007 (US–Dominican Republic), 1 July 2006 (US–Guatemala), 1 April 2006 (US–Honduras), 1 March 2006 (US–El Salvador) [CAFTA]; and the bilateral *Australia – United States Free Trade Agreement* (18 May 2004), <http://tcc.export.gov/Trade_Agreements/All_Trade_Agreements/exp_002771.asp> (entry into force 1 January 2005) [AUSFTA].
25. For more information on the issue see Electronic Frontier Foundation, <http://www.eff.org/IP/WIPO/broadcasting_treaty/>, and for critical analysis see, James Love, "WIPO carves up the Internet (and the Broadcast Spectrum)," (4 May, 2006) *Huffington Post*, <http://www.huffingtonpost.com/james-love/wipo-carves-up-the-intern_b_20336.html>. As for the consolidated Draft of the WIPO *Treaty on the Protection of Broadcasting Organisations*, see, WIPO, Standing Committee on Copyright and Related Rights, 15th Session, September, 11 – 13, 2006), <http://www.wipo.int/edocs/mdocs/copyright/en/sccr_15/sccr_15_2.pdf> [WIPO Broadcasting Treaty].
26. See *Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 on the term of protection of copyright and certain related rights*, L290, 1993-11-24, pp. 9–13, <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0012:0018:EN:PDF>>; *Copyright Term Extension Act*, (1998), Pub. L. 105–298, 112 Statutes at Large 2827, <<http://www.copyright.gov/legislation/s505.pdf>> [CTEA].
27. See Lawrence Lessig, *Free Culture: How Big Media uses Technology and the Law to Lock Down Culture and Control Creativity* (Penguin, 2004), <<http://www.free-culture.cc/freeculture.pdf>> at pp. 213–256. See also William M Landes and Richard A Posner, "Indefinitely Renewable Copyright," (2003) 70:2 *University of Chicago Law Review* 471–518, <<http://ssrn.com/abstract=319321>>.
28. Although initially protected under copyright (*Council Directive 91/250/EEC of 14 May 1991 on the legal protection of computer programs* (EU), O.J.L. 122, <http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=31991L0250&model=guichett>, (17 May 1991) 122 *Official Journal of the European Communities*, L 42–46 [EU Computer Programs Directive]), computer programs are increasingly becoming the subject matter of patents.
29. See, *Directive 96/9/EC of 11 March 1996 of the European Parliament and of the Council on the legal protection of databases* (EU), O.J.L. 077, <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0009:EN:HTML>>, (27 March 1996) 77 *Official Journal of the European Communities*, L 20–28 [EU Databases Directive]; and the consecutive attempts to introduce legislation for the protection of databases in the USA (see *Database Investment and Intellectual Property Antipiracy Act* (DIIPA Act), Bill H.R. 3531 (USA, 1996), 104th Congress, <<http://thomas.loc.gov/cgi-bin/query/z?c104:H.R.3531>>; *Collection of Information Antipiracy Act*, Bill H.R. 2652 (USA, 1997), 105th Congress, <<http://thomas.loc.gov/cgi-bin/query/D?c105:1:./temp/~c105Chgr6j:>>; *Collection of Information Antipiracy Act*, Bill H.R. 354 (USA, 1999), 106th Congress, <<http://thomas.loc.gov/cgi-bin/query/D?c106:1:./temp/~c106FL3v9p:>>; *Consumer and Investor Access to Information Act*, Bill H.R. 1858 (USA, 1999), 106th Congress, <<http://thomas.loc.gov/cgi-bin/query/D?c106:1:./temp/~c106qUBtg5:>>; *Database and Collections of Information Misappropriation Act*, Bill H.R. 3261 (USA, 2003), 108th Congress, <<http://thomas.loc.gov/cgi-bin/query/z?c108:H.R.3261.IH:>>).

void³⁰ and enforcement legislation³¹ and mechanisms³² have been greatly toughened. In addition, the new legal field of anti-circumvention law, adopted by the WIPO treaties, has been transposed in an excessively protective manner.³³ The importance of the developments in these jurisdictions is that they act as a compass for the international copyright law system and are prone to pervade national jurisdictions across the globe.

It is self evident that the current in law described above comes as a response to the emergence of the networked information society. Nevertheless, the rationality of such a model for the governance of knowledge in the digital age is highly controversial. It is claimed that the insecurity of the new environment for commerce justifies copyright expansionism. This assertion is based on the argument that if protection is good, more protection is better. However, the concern is that in practice the expansionist current in the global copyright regime has manifold adverse effects on economies through its stunting effect on innovation and market competition. It may also have damaging ramifications for societies by excluding large societal groups or even whole nations from access to knowledge. These are side effects that, on the whole, may outweigh the benefits of the model. The only certainty in this raging debate is the absence of decent scientific analysis on empirical and factual data, which could justify such maximalist measures and provide adequate proof of their necessity.

In theory, the assumptions of the expansionist current may contradict the actual philosophic foundations and justifications of copyright law as they evolved through time. The hypothesis underlying the expansionist current is an equation of intellectual property with tangible property, which is opposed to the traditional notion of copyright as a monopoly right of governmental decree with clearly delineated differences from tangible property rights.³⁴ Furthermore, the one-dimensional reliance on a law and economics approach evident in the expansionist current neglects essential aspects of the copyright paradigm.³⁵

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30. This is the case of the exception for private use of digitized works. It is constantly disputed in the networked information environment and remains in a state of uncertainty.
 31. *Convention on Cybercrime* (23 November 2001), <<http://conventions.coe.int/Treaty/en/Treaties/Html/185.htm>>, 185 *European Treaty Series* (entry into force 1 July 2004) [*Cybercrime Convention*]; *Directive 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights*, O.J.I 195, <[http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0048R\(01\):EN:HTML](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004L0048R(01):EN:HTML)>, (2 June 2004) 195 *Official Journal of the European Communities*, L 16.
 32. In particular, special law enforcement agencies have been formed at the national level and international cooperation has been established in the fields of detection and prosecution.
 33. *Digital Millennium Copyright Act*, (2000) 17 *United States Code* ss. 1201–1205, <http://www.access.gpo.gov/uscode/title17/chapter12_.html> [DMCA]; *Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society* (EU), O.J.I 10, <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32001L0029:EN:HTML>>, (22 June 2001) 167 *Official Journal of the European Communities*, L 10 [EU Copyright Directive]. See Section 3 below for analysis on the topic.
 34. Apart from the fact that the ownership of ideas is an inherently problematic conception from a socio-political perspective due to the power relations it constructs, the assertion of copyright as property finds logical obstacles in the impossibility of exerting possession on abstractions, in the fact that innovation always builds on previous intellectual work, in its public good characteristics and in its limited duration, exceptions and limitations. Furthermore, an equation of copyright with property is above all a flawed policy choice, which can severely limit the public domain and impede future innovation.
 35. Despite its undisputed power as a logical tool to effectively predict efficiency, a law and economics approach cannot account for all the values that copyright law ought to enshrine. From the law and economics perspective, the public interest is best furthered by the promotion of private property rights as the best means of allocating goods and rights in a society and promoting development. As a result, overriding private property interests always prevail upon and finally displace broad social goals such as increasing access to knowledge. See Jessica Litman, *Digital Copyright* (Prometheus Books, 2001) at pp. 79–80. Therefore, a law and economics analysis would be better utilised in conjunction with other doctrines of copyright law.

To sum up, the expansionist current generally ignores public interest issues as they are construed by the A2K principle, and its effects run counter to the economic objectives of copyright law: namely, the widest possible availability and accessibility of intellectual products to society. As Ruth Okediji puts it:

[w]hat has been conspicuously absent in the considerable mobilisation of political resources to secure “maximum strength” global protection of intellectual property rights is an attendant commitment to establish access to intellectual goods as an integral component of the international innovation and competition framework.³⁶

Apart from the above, the most pressing question to be asked is whether or not the expansionist current in law takes into serious consideration the aforementioned potential of the network information society. Is it encouraging or discouraging new collaborative forms of human creativity that have been made possible through the modern communication networks? To give satisfying answers, one should consider the central role of anti-circumvention laws—the newly established component of the modern knowledge governance system—which differentiates itself from traditional copyright legislation, introduces technology into knowledge policy, and has direct relevance with the evolving current of control in code.

2.3. Code, Architecture and Technologies of Control

The phenomenon of large-scale piracy, which followed the emergence of the networked information society, and the inability of states to adequately police the new environment and enforce “real world” laws on its inhabitants, has led the content industry to employ self-protection methods in order to guard intellectual property rights in the digital world. Inspired by the maxim “the answer to the machine is in the machine,”³⁷ rights holders, recognizing the benefits of code in manipulating behaviour, have engaged in the development and deployment of technologies of control in what was previously a largely control-free environment. The most important of these technologies are currently represented by the umbrella terms “Digital Rights Management systems” (DRMs) and “Trusted Computing systems” (TCs).

The function of DRMs³⁸ comprises two separate, albeit interrelated, concepts: namely, the management of digital rights (MDR), which concerns the description of intellectual property rights and permissions in machine readable

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36. Ruth Okediji, “Sustainable Access to Copyrighted Digital Information Works in Developing Countries,” in Jerome Reichman and Keith Maskus, eds., *International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime* (Cambridge University Press, 2005) 142–187 at p. 144 [Okediji, “Sustainable Access”].
37. Charles Clark, “The Answer to the Machine is in the Machine” in P Bernt Hugenholtz, ed., *The Future of Copyright in a Digital Environment: Proceedings of the Royal Academy Colloquium organised by the Royal Netherlands Academy of Sciences (KNAW) and the Institute for Information Law (Amsterdam 6-7 July 1995)* (Kluwer Law International, 1996) 139–145 at p. 139.
38. DRMs could be defined as “the technologies and/or processes that are applied to digital content to describe and identify it and/or to define, apply and enforce usage rules in a secure manner” (WIPO, “Current Developments in the Field of Digital Rights Management,” Standing Committee on Copyright and Related Rights, 10th Session 2d Revision (1 August 2003), <http://www.wipo.int/documents/en/meetings/2003/sccr/pdf/sccr_10_2.pdf> at p.4 [WIPO, *Current Developments*]).

form and manages transition of content between platforms,³⁹ and the digital management of rights (DMR), which involves technical protection measures (TPM) that ensure compliance with MDR. Simply put, the former element represents the management aspect of DRMs, whilst the latter delineates the enforcement aspect of DRMs, which is more relevant to the current analysis. DRMs and their components⁴⁰ have various applications and derive important benefits both for rights holders and for consumers. In particular, they contribute significantly to the commodification of informational goods and the construction of a robust electronic marketplace in the networked information society by ensuring adequate remuneration for rights holders and by partially hindering unauthorized copying.⁴¹ They also prove to be beneficial for markets, as they introduce new business models and increased opportunities for profit through diversification in products and services and consequent price discrimination. From a consumer's point of view, interoperability between these new technologies has the potential to open previously unimaginable opportunities for the enjoyment of information commodities by facilitating unrestrained access to content from different platforms and devices at any time and place. Lastly, independent artists can exploit certain characteristics of DRMs, such as direct payment components, in order to establish direct commercial contact with consumers without the need for middlemen for the propagation of their intellectual works. Notwithstanding their beneficial aspects, DRMs and TPM in particular are mainly used, however, as instruments of unrestrained control on digital content and barriers to A2K, which make them a contentious issue in the networked information society.

On the other hand, TCs⁴² are a novel and revolutionary set of technologies which aim to address information security problems through hardware modifications in personal computer platforms. The ingenuity of these technologies lies in their capacity to establish secure areas in computer platforms, which can then be used to implement a specified policy. Given that TCs are a technology in progress, safe conclusions about their nature cannot be reached; at the same time, this technology may prove highly beneficial in constructing a trustworthy and secure information environment and could reveal new and unforeseen applications in the future. In the context of this paper, TCs may seem irrelevant at first glance, yet a thorough examination of the function

39. For example, Moving Picture Expert Group 21, < <http://mpeg.chiariglione.org/standards/mpeg-21/mpeg-21.htm>>.

40. DRMs components include secure containers, rights expression languages, content identification and description systems, mechanisms for the identification and authentication of content users, digital watermarking and fingerprinting technologies, electronic payment systems and components which protect the system from malicious attacks or reverse engineering. See Niels Rump, "Digital Rights Management Technological Aspects: Definition, Aspects and Overview" in Eberhard Becker, Willms Buhse, Dirk Günnewig, and Niels Rump, eds., *Digital Rights Management—Technological, Economic, Legal and Political Aspects* (Springer Verlag, 2003) 3–15 at pp. 7–10 [Becker, Buhse, Günnewig and Rump, *Digital Rights Management*].

41. The effectiveness of DRMs in eliminating piracy is strongly disputed. Once circumvention of a DRM is achieved, unlocking mechanisms can be easily distributed through the net and render it useless. It may be contested, however, that DRMs are an important tool in combating piracy since they add a layer of protection in code and require additional action for their circumvention, thus inhibiting the widespread phenomena of piracy. See Stuart Haber, Bill Horne, Joe Pato, Tomas Sander, Robert E. Tarjan, "If Piracy is the Problem, Is DRM the Answer?", in Becker, Buhse, Günnewig and Rump, *Digital Rights Management – Technological, Economic, Legal and Political Aspects*, supra note 40. Springer Verlag (2003), and Peter Biddle et al, *The Darknet and the Future of Content Distribution*, Proceedings of the 2002 ACM Workshop on Digital Rights Management, (2002) <<http://msl1.mit.edu/ESD10/docs/darknet5.pdf>>.

42. "A trusted system is a system that can be relied on to follow certain rules." Mark Stefik, "Shifting the Possible: How Trusted Systems and Digital Property Rights Challenge Us to Rethink Digital Publishing," (1997) 12:1 *Berkeley Technology Law Journal* 137–159, <<http://www.law.berkeley.edu/journals/btlj/articles/vol12/Stefik/html/text.html>> at p. 139 [Stefik, "Shifting the Possible"].

and features⁴³ of contemporary TC platforms⁴⁴ reveals their capacity to act as a basis for the enforcement of rules incorporated in DRMs.⁴⁵ In an influential book, Mark Stefik reveals the interrelation of DRMs and TCs:

The technological response to this risk is to use trusted systems, which protect digital works using a set of rules describing fees, terms and conditions of use. These rules, written in a machine-interpretable digital-rights language, are designed to ensure against unsanctioned access and copying and to produce accurate accounting and reporting data for billing.⁴⁶

Thus, digital protection, which combines DRMs and TCs, becomes much more difficult to tamper with and confers to the rights holders almost complete control over their digitized work. Among the multiple facets of the TCs issue, it is the latter that becomes particularly relevant and will be referred to throughout the current analysis.

As seen above, DRMs and TCs tend to implement technologies of control at the layers of the networked information environment. DRMs and, especially, TPMs place control at the logical layer, whilst TCs can enhance that control by interfering in the physical layer.⁴⁷ As opposed to the aforementioned technologies of freedom, which lie at the logical layer of the environment, these technologies give rise to a distinct current of control in code, putting technology at the centre of the knowledge governance debate and gradually redefining the identity of the network information society towards more control. As this current evolves in combination with the expansionist current in law, particularly the new field of anti-circumvention law, it constructs a strongly regulated environment and creates an imbalanced regime prejudiced against the concept of A2K.

2.4. A2K and the Ecology of Ideas

In the same sense that environmentalism was a belated response to the industrial revolution, the A2K current aspires to be the response to the counter-effects of the information revolution. Purporting to establish an acceptable ecology in the marketplace of ideas, it rises to counter the currents of control in code and law.⁴⁸ The chronicle of the current officially commenced at the international level

43. The main features consist of memory curtaining, secure input and output, sealed storage and remote attestation.

44. Current initiatives on TCs include, *inter alia*, the Microsoft NGSCB (formerly Palladium), the Trusted Computing Group (formerly TCPA), Intel LaGrande Technology and AMD Secure Execution Mode (SEM).

45. The examples of deployed TCs in direct combination with DRMs are numerous: e.g., the Lenovo ThinkPad, which bundles biometrics with TPM. See Andy Dornan, "Yes, Trusted Computing Is Used For DRM," (17 February 2006) *Information Week*, <http://www.informationweek.com/blog/main/archives/2006/02/yes_trusted_com.html>.

46. Mark Stefik, *The Internet Edge: Social, Technical, and Legal Challenges for a Networked World*, (2000) MIT Press, at p. 55.

47. Other technologies of control at the logical layer of the network exist, which could, according to the wishes of the physical layer owners, create a two- or more tiered networked information environment with a fast, but pay-per-use and thus commercialized top tier upon a cheap, though slow, lower tier. For an introduction to the relevant net neutrality debate see Timothy Wu, "Network Neutrality, Broadband Discrimination," (2003) 2 *Journal on Telecommunications and High Technology Law* 141–175 <<http://ssrn.com/abstract=388863>>. The focus of this paper will be solely the case of DRM and TC.

48. For analogies between the environmental movement and the politics of intellectual property, see James Boyle, "A Politics of Intellectual Property: Environmentalism for the Net?" (1997) 47:1 *Duke Law Journal* 87–116, <http://www.law.duke.edu/boylesite/intprop.htm> [Boyle, "Politics of IP"].

with the WIPO General Assembly's 2004 adoption of the proposals of Brazil and Argentina for a Development Agenda,⁴⁹ putting forward, *inter alia*, the adoption of a WIPO Treaty on A2K. The issue of A2K was again brought to the front line by the Geneva Declaration on the future of WIPO, signed in the same year by a large coalition of civil society actors and business representatives.⁵⁰ A Treaty on A2K was then discussed in February 2005 at an experts' meeting in Geneva and finally drafted in May of the same year.⁵¹ Although the prospects of both the Treaty and the WIPO Agenda remain uncertain, and little progress has been made during the discussions in the WIPO Provisional Committee (PCDA),⁵² a shift towards the employment of a more critical attitude with regards to protectionist approaches in the governance of knowledge in the digital age may well be in the pipeline.

A2K is a multifaceted term,⁵³ and as such it is difficult to define. In general, it should be viewed primarily as a strategic aim and a set of principles, but also as a socio-political movement born in the matrix of the networked information society. The A2K current envisions knowledge as central to human growth and gives a holistic proposal on how it should be governed in the digital age. Therefore, its aim is firstly, to enhance the production of information, knowledge and culture in the network by encouraging new models of non-market and decentralized, peer and collaborative research and information production,⁵⁴ which have arisen in the network information environment alongside and in harmony with the traditional proprietary market models of information production. Secondly, its aim is to distribute the fruits of that production equitably—both within societies and across the globe—thus effectively bridging divides between information poor and rich.

The great advantage of the A2K intellectual framework is in its capacity to bridge a variety of distinct pre-existing concepts and accommodate differing aims and interests under a relatively simple set of principles. With that perspective, it is not surprising that a diverse socio-political movement has formed around the A2K meme, uniting actors and interest holders, not only from civil society or academia, but also from business and the public sector, and are represented at

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49. See WIPO, "General Assembly Decision on a Development Agenda" (4 October 2004), available at Consumer Project on Technology <<http://www.cptech.org/ip/wipo/wipo10042004.html>>. As for the proposal by Argentina and Brazil, see WIPO, "Proposal by Argentina and Brazil for the Establishment of a Development Agenda for WIPO" (27 August 2004), General Assembly 31st Session, 11th Revision, <http://www.wipo.int/documents/en/document/govbody/wo_gb_ga/pdf/wo_ga_31_11.pdf>.
 50. *Geneva Declaration on the Future of the World Intellectual Property Organisation* (29 September 2004), available at Consumer Project on Technology, <<http://www.cptech.org/ip/wipo/futureofwipodeclaration.html>>.
 51. WIPO, *Treaty on Access to Knowledge* (Draft of 9 May 2005), available at Consumer Project on Technology, <http://www.cptech.org/a2k/a2k_treaty_may9.pdf> (draft) [Treaty A2K].
 52. For more information, see relevant webpage of the Consumer Project on Technology, <<http://www.cptech.org/ip/wipo/pcda/>>.
 53. Ruth Okediji places the first element of the A2K term—namely, access—into categories of access: protected knowledge and access to unprotected knowledge (Okediji, "Sustainable Access," *supra* note 36 at pp. 147–152). Furthermore, the second element, namely knowledge, can be classified into four different components, according to Yochai Benkler's typology: human knowledge, information, information-embedded goods (for example, drugs), and tools for producing the latter (for example, computers). Yochai Benkler, *The Wealth of Networks – How Social Production Transforms Markets and Freedom* (Yale University Press, 2006), <http://www.benkler.org/Benkler_Wealth_Of_Networks.pdf> at pp. 311–315 [Benkler, *Wealth of Networks*].
 54. Most prominent are the Free Libre Open Source Software (FLOSS) movement in software, the Open Access Publishing initiative in science, the Bloggers movement in the media sphere, the Wikipedia project in the field of collective knowledge, and the Creative Commons project in the field of law, to name but a few. But, apart from these phenomena of non-market production, it is also no exaggeration to claim that most of the information, knowledge and culture circulated in the networked information environment is generated on a not-for-profit basis, and that only a small segment of the net is commanded by commercial rules. For more analysis on these phenomena and the concept of the networked information economy see, Benkler, *Wealth of Networks*, *supra* note 53.

a diplomatic level by prominent developing countries. Although the diversity of the movement inevitably creates a heterogeneity in its demands and aspirations, they nevertheless meet at certain focal points: for example, the preservation and expansion of the public domain and the innovation commons of the networked information environment, the promotion of non-commercial, decentralized and participatory information production, the lowering of barriers for accessing protected knowledge, the full exploitation of innovative ICT technologies and the encouragement of healthy market competition.

But what are the justifications for such an ambitious shift in the way society produces and disseminates knowledge? Proponents of A2K aim to justify it on grounds of human liberty, autonomy, democracy, critical cultural creation, justice and development.⁵⁵ As far as liberty and autonomy are concerned, rather than relying solely on centralized and proprietary information production, the A2K intellectual framework suggests the adoption of policies that encourage participatory and decentralized ways to produce information, thereby granting the individual autonomy from commercial or hierarchical constraints to choose whether to innovate independently or in collaboration with others. Arising from the enhanced autonomy of the individual, such a shift in knowledge production and distribution has an essentially beneficial impact, not only on political discourse and participation, but also on cultural creation. In terms of justice, the reliance of the A2K model upon non-proprietary information production guarantees a more equitable distribution of knowledge and equality in opportunities, between nations as well as between individuals.⁵⁶ More importantly, however, the A2K current adheres to values and pursues objectives that have long been articulated by the burgeoning movements in the networked information society and which best correspond to its potential for social and economic development. It is this commitment to the new that makes A2K principles even more crucial in the construction of an appropriate model for the governance of knowledge in the digital age. Naturally, the whole A2K framework relies on the assumption that non-commercial, decentralized and participatory information production is a viable alternative, in parallel to the traditional commercial ways in which knowledge is produced and distributed. This, of course, is not a self-evident truth but an assumption that awaits verification.

It would appear to some that A2K is a concept hostile to or even incompatible with the idea of protecting information either through law or through code, but actually the opposite is true. As implied by the A2K term, A2K advocates the facilitation of access to information, knowledge and culture, and not the abolishment of their protection. In fact, it is certain that with sound compromises and the resolution of emergent conflicts, the currents of control and A2K in code and law could blend together to provide a balanced model

55. Benkler, *Wealth of Networks*, *supra* note 53, at pp. 7–16.

56. Jack Balkin writes: "if you can produce the same or greater amounts of these [Yochai Benkler's] four components and distribute them more widely and equitably both within countries and across national borders, justice demands this." Jack Balkin, "What is Access to Knowledge," blogposting to *Balkinization* (21 April 2006), <<http://balkin.blogspot.com/2006/04/what-is-access-to-knowledge.html>>. For more about Yochai Benkler's four components, see Benkler, *Wealth of Networks*, *supra* note 53, at pp. 311–315. See also Yochai Benkler, "Freedom in the Commons: Towards a Political Economy of Information," (2003) 52:6 *Duke Law Journal* 1245–1276, <<http://www.law.duke.edu/shell/cite.pl?52+Duke+L.+J.+1245>> at pp. 1269–1272 [Benkler, "Freedom in the Commons"].

for the governance of knowledge in the networked information society. Such compromises can be found in the relevant chapter of the draft Treaty on A2K regarding DRMs and anti-circumvention laws.⁵⁷

Most interesting is the relationship between A2K and copyright law. The access principle, although in reality not a legal concept in the strict sense, is deeply ingrained in most doctrines of the copyright paradigm, which in one way or another concern public interest issues. Copyright law is a mechanism that ensures access to intellectual works for the public at large in three different ways. Firstly, its very existence as a posited field of law is justified, *inter alia*, in economic terms as a monetary incentive to encourage intellectual production and to ensure that authors share their works with society instead of keeping them for themselves. In other words, copyright provides economic rewards to authors, and creates an economic basis for capital investment in and industrial exploitation of innovation, in order to stimulate creativity and make the fruits of intellectual labour widely available to the public. Therefore, the exclusive rights on works in the copyright paradigm are deemed as an essential trade-off between rights owners and society in order to increase A2K.

Furthermore, the copyright paradigm incorporates a number of doctrines which "limit the scope of the copyrightable subject matter"⁵⁸ and in this way leave certain categories of information, knowledge and culture free from protection and open to unrestrained access. In particular, the idea/expression dichotomy guarantees that ideas, facts and data⁵⁹ remain unprotected and free for all to work upon for future innovation, while the condition of originality as a prerequisite for protection, which exists variedly in most jurisdictions, keeps non-original and thus unimportant works, freely accessible. Given that intellectual innovation is a procedure which will always build on previous intellectual achievements, the limitations of copyright's scope plays the role of sustaining a healthy and extensive public domain, to which future innovators have unencumbered access to draw upon the material essential for their work.

At a third level, copyright provides necessary access mechanisms to protected works through limitations and exceptions to its exclusive rights. Copyright limitations and exceptions represent situations where the legislature has chosen to prioritize the public interest over the interests of the rights owner.⁶⁰ Such limitations on public interest grounds include the limitation on the duration of exclusive rights, which ensures public access after their expiration. Another important limitation is the exhaustion of copyright after the first sale of the protected work, known as the first sale doctrine in the USA or the exhaustion doctrine in the Member States of the EU. But the primary mechanism for ensuring access under the copyright regime concerns the exceptions to exclusive rights

57. Treaty A2K, *supra* note 51 at art. 3–6, "Digital Rights Management and Measures Regarding Circumvention of Technological Protection Measures."

58. Okediji, "Sustainable Access," *supra* note 36 at p. 148.

59. In the EU, database protection law (EU Databases Directive, *supra* note 29) appears to protect mere facts and data with evident negative ramifications for information production, thus compromising the idea/expression doctrine. See Commission of the European Communities, "First evaluation of Directive 96/9/EC on the legal protection of databases" (12 December 2005), DG Internal Market and Services Working Paper, <http://ec.europa.eu/internal_market/copyright/docs/databases/evaluation_report_en.pdf>.

60. For instance, the reverse engineering exceptions for computer programs are designed to ensure that the rights owner will not abuse her monopoly to the detriment of competition in the relevant market, exceptions which in the last analysis represent the public interest objective of sustaining free market competition.

granted under certain circumstances and conditions which permit free usage of the protected work for the purpose specified by the exception.⁶¹ A more radical and direct way to provide access is through statutory or compulsory licensing, which is granted in special cases or when exclusive rights have extremely adverse social or economic effects.⁶² In conclusion, A2K is a core component of the copyright paradigm, representing in most cases the public interest objectives embedded in its doctrines.

A2K could also be viewed from a human rights perspective. Human rights principles are crucial for social and economic development and the construction of a just and prosperous networked information society. The A2K intellectual framework offers a model of development founded on the principles of human autonomy and participation, as well as fair distribution and equality. The model proposes access to information, knowledge and culture for all as the best path for the flourishing of mankind. A right to access is embedded within the human rights of freedom of expression,⁶³ education,⁶⁴ participation in cultural life and the enjoyment of the benefits of scientific progress and its applications,⁶⁵ and is of direct relevance to the right to a decent standard of living⁶⁶ as well as to the prohibition of discrimination.⁶⁷ Cases of conflict between the right to access and intellectual property rights, which are also recognized as human rights,⁶⁸ ought to be resolved in the most balanced way, without putting in jeopardy the core of the rights and with an emphasis on how best to serve the public interest.

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3. CONTROLLING ACCESS THROUGH CODE

IN CONTRAST TO THE SUPREMACY OF LAW in the tangible world, in the networked information society, technology is the most important factor in the governance

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61. At the international level, article 10(2) of the *Berne Convention*, *supra* note 19, provides for an exception to the reproduction right for teaching purposes. Other exceptions legislated in national laws are required to be consistent with the "three step test" of article 9(2) of the aforementioned Convention, as it was expanded by article 9(1) of TRIPS, *supra* note 20, and article 10(2) of the WCT, *supra* note 23. In civil law jurisdictions copyright exceptions are extensively codified by statute, while common law jurisdictions follow a more flexible approach, relying much more on judicial interpretation of open legal doctrines than on statutory codification (i.e. the fair use doctrine in the USA and the fair dealing doctrine in Commonwealth countries).
 62. International mechanisms of compulsory licensing are mainly provided in the Appendix to the *Berne Convention*, *supra* note 19, Appendix *Special Provisions Regarding Developing Countries*, and the Doha Declaration on TRIPS and Public Health (WTO General Council, "Implementation of Paragraph 6 of the Doha Declaration on the TRIPS Agreement and public health), Decision of General Council (30 August 2003), WT/L 540 and Corr. 1, <http://www.wto.org/english/tratop_e/trips_e/implem_para6_e.htm>).
 63. Article 19 of the *Universal Declaration of Human Rights* (UDHR) further specifies freedom of expression as "freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers." *Universal Declaration of Human Rights* (10 December 1948), GA Resolution 217 (III), UN GAOR, 3d Session, Supplement No. 13, UN Doc A/810 (1948), <<http://www.un.org/Overview/rights.html>> [UDHR].
 64. UDHR, *supra* note 63, at art. 26.
 65. *International Covenant on Economic, Social and Cultural Rights* (16 December 1966), <http://www.unhcr.ch/html/menu3/b/a_ceschr.htm>, 993 *United Nations Treaty Series* 3 (entry into force 3 January 1976) at arts. 15(1)(a)-(b) [ICESCR].
 66. UDHR, *supra* note 63, at art. 25(1).
 67. UDHR, *supra* note 63, at art. 7. There have been voices in the WSIS process which strongly advocate the constitution of a new international bill of rights for the digital age, with the aim of reforming and updating the existing human rights regime as articulated in the UDHR, *supra* note 63. A separate right to A2K would have a rightful place in such a reform. See, for example, Association for Progressive Communications, "Internet Rights Charter" (2006), <<http://rights.apc.org/charter.shtml>>.
 68. UDHR, *supra* note 63, at art. 27; ICESCR, *supra* note 65, at art. 15(1)(c).

of knowledge. Technology moulds the code and architecture of the networked world and is the main tool for regulation and rule enforcement in the new environment. It therefore plays a central role in any model for the governance of knowledge in the digital age.⁶⁹

In the contemporary governance model, existing patterns of interrelation between code and the law, determined as they are by the currents described in chapter I, draw the networked information society to a specific trajectory.⁷⁰ Although technology can be developed to enhance freedom of creativity, to facilitate control of intellectual property or even to strike a just balance between the two, it is currently largely employed in an imbalanced manner as a means of exerting control by excluding and even eliminating the aspect of freedom. Law intervenes in the same manner in order to protect deployed technologies of control in the form of anti-circumvention laws. Furthermore, A2K and its principles are consistently ignored in the name of protection with serious consequences for societies and economies. In an environment with virtually unlimited opportunities for human creativity, code and the law are purposefully moulded in a way which ignores the future and sticks to the worst of the past.

While the currents in code and law were described in the previous section, the main focus of this section will be code as a factor of regulation and its interrelation with law. I will argue that, in the absence of any legal constraints on it, code proves to be the main factor for the imposition of rules in the networked world; such rules often abstain from the policies incorporated in law that normally represent public interest objectives. It will then be attested that this displacement of law by code significantly impedes access to information, knowledge and culture and determines the identity of the networked information society in a way that curtails its potential for social and economic development.

3.1. *The Law of Code*

In the contemporary networked information society, the law that regulates code has been strictly orientated towards the protection of patterns of control in code and architecture, including the DRMs and TCs that implement them. The current centre of interaction between law and code is in the field of anti-circumvention law, which emerged relatively recently in jurisprudence and which should be analysed as a body of law separate from copyright or other legal fields, due to the particularities of its nature, aims and function. In principle, the term “anti-circumvention law” refers to legal provisions that outlaw the act of circumventing TPMs and the acts of producing or distributing circumvention tools.

At the international level, the evolution of anti-circumvention laws

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69. The idea that “code is law” in cyberspace was introduced by Joel Reidenberg in “Lex Informatica: The Formulation of Information Policy Rules Through Technology” (1998) 76:3 *Texas Law Review* 553–594, <http://reidenberg.home.sprynet.com/lex_informatica.pdf> and further analyzed by Lawrence Lessig in, *Code and Other Laws of Cyberspace* (Basic Books, 1999) [Lessig, *Code*].
70. Pamela Samuelson depicts certain types of interrelation between technology and the law: “DRM has more than one potential relationship with the law: it can enforce, displace, and override legal rights, while the law can constrain the design of DRM.” Pamela Samuelson, “DRM {and, or, vs.} the Law,” (2003) 46:4 *Communications of the ACM* 41–45 at p. 45, <http://www.ischool.berkeley.edu/~pam/papers/acm_v46_p41.pdf>. However, as will be analyzed below, the current function of law mainly pertains to the first three categories and only in the context of control on information, while legal constraints on DRMs and TCs or policies of access in the law of code are to a large extent absent.

commenced in 1996 with the adoption of the WIPO *Copyright Treaty* (WCT) and the *World Performances and Phonograms Treaty* (WPPT).⁷¹ The treaties draw on previous work completed at WIPO⁷² and are predated by several legislative initiatives at the national, regional and international levels, containing anti-circumvention rules for the protection of TPM on video, audio and software.⁷³ With provisions of similar articulation, both treaties prohibit the circumvention of effective technological measures used by copyright holders for the protection of their works⁷⁴ and “in connection with authors’ exercise of their copyright rights under the Berne Convention and the WCT.”⁷⁵ The aforementioned provisions appear not to refer to acts of production or distribution of circumvention devices, but only to the act of circumvention itself.⁷⁶ Nevertheless, they contain many ambiguities bound to create problems due to differing implementation in national jurisdictions.⁷⁷ They have been mainly interpreted as engulfing the protection of both “access control” and “copyright control” TPMs, even though the Berne and WCT Conventions do not directly recognize an exclusive copyright right of access. It is also worth mentioning that the Treaties were adopted in a period when the usage of DRMs was still scarce, their effects unknown and the networked information society still too premature to appropriately accommodate such restrictive interventions. Therefore, the adoption of the Treaties at that time contributed to the shaping of the networked information society towards a controlled environment and contrary to the principle of deregulation that should characterize public policies related to technology.

Also relevant to anti-circumvention law are the provisions of the Council of Europe *Cybercrime Convention* (2001),⁷⁸ which bans acts of illegal access, illegal interception and misuse of devices. Even though it has been a remarkable effort to legislate common minimum rules for the effective policing of the new environment, in an age when cybercrime has become a major concern,

71. WCT, WPPT, *supra* note 23.

72. See Mihaly Ficsor, *The Law of Copyright and the Internet: The 1996 WIPO Copyright Treaties, their Interpretation and Implementation* (Oxford University Press, 2002) at paras. 6.02–6.07 (describing the 1989 draft WIPO “Model Provisions for Legislation in the Field of Copyright”).

73. See anti-circumvention provisions in the *North American Free Trade Agreement* (*North American Free Trade Agreement*, Canada–United States–Mexico (17 December 1992), <http://www.nafta-sec-alena.org/DefaultSite/index_e.aspx?DetailID=78>, 1994:2 *Canada Treaty Series*, (1993) 32 *International Legal Materials* 289 (entry into force 1 January 1994) at art. 1707(a)). In the USA in relation to satellite TV transmissions, see (2000) 47 *United States Code* s. 605(e)(4), <http://www.access.gpo.gov/uscode/title47/chapter5_subchapter10_subchapter10.html>. In relation to serial copyright management systems, see *Audio Home Recording Act*, (2000) 17 *United States Code* s. 1002(c) (Supplement V 1993), <http://www.access.gpo.gov/uscode/title17/chapter10_subchapter10.html> [AHRA]. In the EU concerning software programs see *EU Computer Programs Directive*, *supra* note 28, at art. 7(1)(c); in the UK regarding circumvention devices in general, see *Copyright, Designs and Patents Act 1988* ch. 48 (UK), <http://www.opsi.gov.uk/acts/acts1988/Ukpga_19880048_en_17.htm> at s.296 (now amended). For the legislative prehistory of the anti-circumvention law see among others, Ian Brown, “The Evolution of Anti-Circumvention Law,” (2006) 20:3 *International Review of Law, Computers & Technology* 239–260, <<http://www.cs.ucl.ac.uk/staff/I.Brown/anti-circ.pdf>> [Brown, “Evolution of AC Law”].

74. See WCT, *supra* note 23 at art. 11 and WPPT, *supra* note 23, at art. 18.

75. WIPO, *Current Developments*, *supra* note 38, at p. 42.

76. Nevertheless, the Treaties do not prohibit such provisions and thus leave it to the discretion of the Member States to enact them, if necessary.

77. Such ambiguities are due to the lack of any definitions of “effective technological measures,” “effective legal remedies,” “used by authors in connection with the exercise of their rights under this Treaty or the Berne Convention,” and “that restricts acts, in respect of their works, which are not authorised by the authors concerned or permitted by law.” For analysis on the topic, see Urs Gasser, “Legal Frameworks and Technological Protection of Digital Content: Moving Forward towards a Best Practice Model,” (June 2006), <<http://ssrn.com/abstract=908998>> [Gasser, “Legal Frameworks”].

78. *EU Cybercrime Convention*, *supra* note 31, at arts. 2, 3, 6.

this Convention has been criticized for over-criminalizing tendencies and not providing adequate safeguards for due process in law enforcement.⁷⁹

Lately, there has been a marked shift to introduce anti-circumvention provisions in national jurisdictions through bilateral agreements,⁸⁰ mainly between the USA and other countries, while renewed activity of the same kind at the international level led to their inclusion in the draft WIPO Broadcasting Treaty proposal.⁸¹

In the USA, the debate around anti-circumvention law and its applicability began in 1995 with the White Paper "on Copyright and the National Information Infrastructure" (NII),⁸² which is also considered to have significantly influenced the legislative process of the WCT. The NII White Paper led to the enactment of the controversial 1998 *Digital Millennium Copyright Act* (DMCA).⁸³ Title I of the DMCA implements the WCT anti-circumvention provisions and is ostensibly the most important piece of US anti-circumvention legislation to date. During its legislative process, the DMCA anti-circumvention provisions were subjected to heavy criticism for enacting draconian protection even beyond the requirements of the WCT⁸⁴ and causing possible adverse effects on the networked information society. As far as its substantive provisions are concerned, the DMCA applies the following categorizations: on the one hand, it categorizes TPMs as controlling access to and the usage of protected material, and on the other hand, it characterizes plain circumvention and the manufacture, sale, distribution or trafficking of circumvention mechanisms as prohibited acts. Whilst outlawing the latter acts in relation both to access and usage control TPMs,⁸⁵ the DMCA's banning of the actual act of circumvention refers only to access control mechanisms.⁸⁶ Violation of any of these prohibitions is subject to civil and, in some cases, criminal penalties. The Act also sets out a list of exceptions to the banned acts for legitimate purposes, such as security testing, reverse engineering, encryption research or law enforcement.⁸⁷ The DMCA has been a highly influential piece of legislation in the evolution of anti-circumvention law, since it has been utilized in many cases as a template in the spreading of anti-circumvention provisions across the globe during the last few years.

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79. Whilst Member States of the Convention are obliged to implement its strong criminalization and international cooperation provisions in their national law, implementation and specification of its relatively weak provisions for safeguarding individual rights and liberties is left to their discretion. See Miriam F Miquelon-Weismann, "The Convention of Cybercrime: A Harmonized Implementation of International Penal Law: What Prospects for Procedural Due Process?" (2005) 23:2 *The John Marshall Journal of Computer & Information Law* 329–361.
80. Brown, "Evolution of AC Law," *supra* note 73, at pp. 243–245.
81. Indicatively, paragraph 1 of article 19 of the draft *WIPO Broadcasting Treaty*, *supra* note 25, states: "[c]ontracting Parties shall provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by broadcasting organizations in connection with the exercise of their rights under this Treaty and that restrict acts, in respect of their broadcasts, that are not authorized by the broadcasting organizations concerned or are not permitted by law."
82. US Working Group on Intellectual Property Rights of the National Information Infrastructure (NII) Task Force, "Intellectual Property and the National Information Infrastructure" (September 1995), <<http://www.uspto.gov/web/offices/com/doc/ipnii/>> at pp. 177–200.
83. DMCA, *supra* note 33.
84. See e.g. Jessica Litman, *Digital Copyright*, (2001) Prometheus Books.
85. DMCA, *supra* note 33, at paras. 1201(a)(2) and 1201(b).
86. DMCA, *supra* note 33, at para. 1201(a)(1). Possible reasons are that "in such cases, traditional copyright law applies" or that "through this omission, copyright limitations such as the fair use defence may be preserved." S Bechtold, "Trusted Computing: Rechtliche Probleme einer Entstehenden Technologie," (2005) *Computer und Recht*, <http://www.coll.mpg.de/pdf_dat/2005_20online.pdf> at p. 333, note 45.
87. DMCA, *supra* note 33, at paras. 1201(d)–(j).

In the EU, anti-circumvention provisions appeared relatively early in regional legislation with regard to the protection of software⁸⁸ and TV/radio broadcasting.⁸⁹ Nevertheless, the most important anti-circumvention rules are those included in the 2001 EU Copyright Directive (EUCD),⁹⁰ which implement the WCT. The EUCD was enacted amid unprecedented lobbying and controversy over its suitability.⁹¹ Like the DMCA, the EUCD anti-circumvention provisions categorize TPMs as those that refer either to access or usage control,⁹² and oblige Member States to prohibit both circumventing acts⁹³ and devices.⁹⁴ Unlike the DMCA, they provide for the protection not only of access, but also of usage control TPMs from the actual act of circumvention. Furthermore, Article 8 of the Directive obliges Member States to provide appropriate sanctions and remedies against infringement of its provisions. Of particular note is the treatment of exceptions to circumvention prohibitions under the EUCD, particularly the reliance of the Directive on the willingness of rights holders to take voluntary measures for ensuring access to and use of protected works in certain circumstances,⁹⁵ and an obligation of Member States to intervene only in the absence of such measures.⁹⁶ Neither the voluntary measures that rights holders need to take, nor the process of intervention by Member States, are adequately clarified. Furthermore, it is stated that the aforementioned exceptions do not apply to online services, which are naturally the vast majority of services relevant to anti-circumvention rules. In conclusion, the obscurity, complexity and narrowness of the EUCD exceptions regime create serious doubt over its viability and practical applicability.

Apart from anti-circumvention rules, TPMs and the TCs which incorporate them may also be protected and promoted by contract law. In particular, usage contracts, which are directed at users, can be utilized by rights holders to forbid acts of circumventing TPMs. Furthermore, technology licences, which are directed at hardware or software manufacturers, may be utilized to contractually oblige them to produce consumer devices that implement TCs or analogous security mechanisms with embedded DRMs policies and could possibly lead to the market domination of those devices.

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88. Article 7 of the *EU Computer Programs Directive*, *supra* note 28, contains a provision for remedies against "(a) any act of putting into circulation a copy of a computer program knowing, or having reason to believe, that it is an infringing copy; (b) the possession, for commercial purposes, of a copy of a computer program knowing, or having reason to believe, that it is an infringing copy; (c) any act of putting into circulation, or the possession for commercial purposes of, any means the sole intended purpose of which is to facilitate the unauthorized removal or circumvention of any technical device which may have been applied to protect a computer program."
89. *Directive 98/84/EC of the European Parliament and Council of 20 November 1998 on the legal protection of services based on, or consisting of, conditional access* (EU), O.J.L 54, <http://eur-lex.europa.eu/LexUriServ/site/en/oj/1998/L_320/L_32019981128en00540057.pdf>, (28 November 1998) 320 *Official Journal of the European Communities*, L 54–57. The above Directive obliges Member States to provide remedies to counter the production and distribution of circumvention devices. Apart from television and radio broadcasting it also applies to online services.
90. *EU Copyright Directive*, *supra* note 33.
91. Bernt P Hugenoltz, "Why the Copyright Directive is Unimportant and Possibly Invalid," (2000) 11 *European Intellectual Property Review* 501–502, <<http://www.ivir.nl/publications/hugenoltz/opinion-EIPR.html>>.
92. *EU Copyright Directive*, *supra* note 33, at art. 6(3).
93. *EU Copyright Directive*, *supra* note 33, at art. 6(1).
94. *EU Copyright Directive*, *supra* note 33, at art. 6(2).
95. Only a small number of EU copyright law exceptions have been transferred to anti-circumvention law. These concern access to and use of the protected work for teaching and research; photocopying, non-commercial copying and archiving by libraries, educational establishments and museums; ephemeral recording for broadcasting purposes; non-commercial broadcasting; public security; use by persons with disabilities; and private copying.
96. Nevertheless, in the case of the private copying exception intervention is not obligatory, but left to the discretion of the Member States.

Lastly, the most direct way to promote security mechanisms in the networked information society is the enactment of statutes that make the indiscriminate implementation of such mechanisms compulsory for industries and markets. Such direct incursions of the law have taken place in the past in relation to copy control mechanisms⁹⁷ and may happen again in the future even for DRMs or TCs.⁹⁸ However, the suitability of such policies is questionable because they are antithetical to the principles of deregulation, they bring tremendous changes to the code and architecture of the networked world, and they have a limiting impact on the interaction of technology with society.

In conclusion, the law of code, as it has evolved in the current model of knowledge governance, focuses solely on the protection of certain types of code and architecture that facilitate control and thus one-dimensionally equate regulation solely with protection. On the contrary, legal rules that impose obligations related to A2K and the public interest on the controllers of the code and architecture of the networked world are generally absent either in international, regional or national legislation. Hence, law is repeatedly used as a tool to empower and enforce private choices of how knowledge should be governed in the digital age, while simultaneously failing to represent and adequately promote public policy and A2K objectives.

3.2. Code as Law

Code determines the nature of the networked information society. Like law, code can be utilized to impose certain rules on users. Unlike law, code enforces these rules automatically by dictating the architecture of the networked space and leaving the user with no option but to comply. The result of using code as law is a system that authorizes only the kinds of behaviour permitted by its controllers. In this way, laws can be implemented onto code and automatically enforced. Conversely, code can also enforce rules that do not correspond to laws or are even in opposition to it.⁹⁹ In the second case, where “real world” law is being displaced by code, regulation of the networked information society falls into the hands of the controllers of the code, thus raising pressing questions about the allocation of power in the networked world, and more importantly, about the healthy functioning of our democratic systems of governance.

In the current model for the governance of knowledge in the digital age, the interrelations between code and law construct a complex system of control over information, knowledge and culture, which in many cases displaces the rules of law by privately constructed rules in code. Structurally, this system functions through intertwining layers of protection, some based in technology such as DRMs

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97. See, for example, the US AHRA (AHRA, *supra* note 73), which requires the implementation of the Serial Copy Management System (SCMS) by all DAT players; and the US DMCA (DMCA, *supra* note 33, at para. 1201(k)(1)), which makes marketing of VHS video cassette recorders that are not equipped with analogue copy protection illegal.
98. See, for example, the current debate in the USA concerning broadcast flag technologies which refers to incorporation of DRMs policies in TV and radio digital content, and constitutes an attempt to render their adoption mandatory under US law. See Electronic Frontier Foundation, “Broadcast Flag,” <<http://www.eff.org/IP/broadcastflag/>>.
99. The integration of rules with “space” is not a novelty. Arrangements in physical architecture have been utilized since the dawn of mankind to indicate and even enforce rules, as well as inhibit anti-social behaviour (fences around property, locks on doors, etc). However, the interrelation between law and digital code differentiates itself on the basis of the fact that it is much more subtle and sophisticated.

and TCs, and others based in law, namely anti-circumvention rules. It also operates in combination with contract law, technology licences, and finally, copyright law; which together construct a seamless net of almost perfect control. The rules of this system acquire their legal basis in contractual agreements between rights holders and users, and are enforced in the networked information environment by DRMs and TCs. They are further legally protected by anti-circumvention laws. Cases where protection by the aforementioned legal or technological means falls short are then covered by copyright law, while technology licenses are employed at a high level to legally bind major commercial actors in order to establish a pervasion of technologies of control in the markets. Because the law of code intervenes only to protect, but not to regulate and set obligations on code, the rules of the system are determined not by lawmakers but by powerful private actors who have code controlling the space. Therefore, old copyright law, along with its A2K and other public interest mechanisms, is gradually ceding its position to a new, *ad hoc* privatized "property right."¹⁰⁰ As a result, information is gradually becoming a fully owned commodity with all of its possible uses controlled by technology on a pay-per-use basis.

Let us first analyze the various layers of the system. First and foremost, code in the form of DRMs and TCs plays a central role as the layer that directly enforces the rules designed to govern the access and use of information, knowledge and culture in the networked world. But, what is the nature of these rules? Given that copyright is the field of law that traditionally determines those rules by striking the right balance between the interests of authors and those of society, it is logical to expect that modern DRMs and TCs policies adhere to it when constructing the architecture of the digital environment. In practice though, DRMs and TCs mainly implement the rules that are set out in usage contracts between users and rights holders, and have little in common with traditional copyright doctrines. In the absence of a clear relationship between copyright and contract law in most jurisdictions,¹⁰¹ the latter is widely utilized by rights holders to extend the protection of information beyond the boundaries of copyright law, and to contract out of obligations and limitations to their rights, such as fair use or other exceptions.¹⁰² With respect to the facts that automated contracts are prevalent in ecommerce and that, in any case, they constitute a prerequisite for conducting business in the networked world, it may be argued that contractual agreements ought *de lege lata* to prevail on copyright and override inflexible

100. Stefan Bechtold, "Digital Rights Management in the United States and Europe" (2004) 52:2 *American Journal of Comparative Law* 323–382, <http://www.jura.uni-tuebingen.de/bechtold/pub/2004/DRM_AJCL.pdf> [Bechtold, "Digital Rights Management"].

101. Only in certain exceptional cases have legislators or courts intervened to prohibit the contracting out of copyright exceptions by private contract terms. See, for example, the pre-emption doctrine in the USA discussed in I Trotter Hardy, "Contracts, Copyright and Preemption in a Digital World," (1995) 1:2 *Richmond Journal of Law and Technology*, <<http://law.richmond.edu/jolt/v1i1/hardy.html>>; article 9(1) of the *EU Computer Programs Directive*, *supra* note 28, and article 15 of the *EU Databases Directive*, *supra* note 29. See though, recital 45 of the EUCD (*EU Copyright Directive*, *supra* note 33) which provides that "[t]he exceptions and limitations referred to in Article 5(2), (3) and (4) should not, however, prevent the definition of contractual relations designed to ensure fair compensation for the rightholders insofar as permitted by national law."

102. As Lucie Guibault argues, "[t]he legislator's approach may have to change, however, considering that rights owners increasingly market their works to end-users subject to the terms of a license of use that set aside the limitations specifically adopted for the benefit of individual end-users." See Lucy Guibault, *Copyright Limitations and Contracts: An Analysis of the Contractual Overridability of Limitations on Copyright* (Kluwer Law International, 2002) at p. 215.

copyright exceptions. However, this assumption undermines the importance of copyright law as a just mechanism in the governance of knowledge and excludes factors such as the difference in negotiating power between the parties and the monopolist nature of intellectual property rights.¹⁰³ Consequently, by their basic adherence to contractually agreed rules, DRM and TCs are alienated from copyright principles and in most cases deprive users of the A2K mechanisms of copyright law. At the core of this issue is the fact that the rules which ultimately determine the code and architecture of the networked information environment are not the outcome of a democratic legislative process, but are found instead in standard contractual terms, unilaterally drafted by holders of exclusive, monopolistic rights, upon which users have limited or no influence.

Another aspect of the interaction between code and law is the relationship between DRM and TCs and consumer protection law. Rules that are enforced via DRM and TCs and which originate, as seen above, from standard contractual licences between rights holders and users, contain clauses which in many cases are unfair and do not stand up to scrutiny under consumer protection legislation.¹⁰⁴ However, DRM and TCs automatically enforce those contractual clauses regardless of their legality and without any effective mechanisms for users to defend their rights. In this case, code is again used in practice in a way that displaces law, in particular consumer protection law, and constructs the rules and the architecture of the space solely according to the biddings of certain powerful market players.¹⁰⁵

Furthermore, the rules of the system are protected legally by anti-circumvention laws. This means of protection arises in the field of law but is directly connected to code as an effective legal tool to outlaw circumventing acts and devices. Nevertheless, contemporary anti-circumvention rules at national or international levels give legal cover to technologies of control without adequate legal provisions that safeguard the public's A2K rights. In particular, both the DMCA and the EU CD anti-circumvention provisions have been subjected to well-grounded criticism for implementing draconian protection of TPM in the networked information society, for being used in the most part for purposes

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103. "Shrink-wrap licences and DRM usage contracts are standardized contracts that are imposed on a mass market. Individual consumers do not have any influence on the specific contractual terms: DRM usage contracts are offered on a take-it-or-leave-it basis." Bechtold, "Digital Rights Management," *supra* note 100, at p. 355. Additionally, in most cases the monopolist nature of intellectual property rights does not give consumers a variety of market choices that could act as a means of pressure for more balanced contractual clauses.
104. Such unfair contractual terms tend to appear in usage contracts of major market actors and usually refer to unilateral changes of the agreed terms and conditions, limitations on liability or interoperability, etc. For instance, the terms of service for the popular iTUNES electronic music store state that "Apple reserves the right, at its sole discretion, to change, modify, add or remove portions of these Terms of Use, at any time" and furthermore that "[i]f you fail, or iTunes suspects that you have failed, to comply with any of the provisions of this Agreement, [...] iTunes, at its sole discretion, without notice to you may: (i) terminate this Agreement and/or your Account [...]; and/or (ii) terminate the license to the software; and/or (iii) preclude access to the Service (or any part thereof)" [emphasis added]. See Lars Grondal, "DRM and Contract Terms" (23 February 2006), <http://www.indicare.org/tiki-read_article.php?articleId=177>.
105. The phenomenon of how consumers are deprived of their basic rights in the digital environment and its legal implications are best described in Jean Braucher's work. See especially Jean Braucher, "New Basics: 12 Principles for Fair Commerce in Mass-Market Software and Other Digital Products," No. 06-05 Arizona Legal Studies Discussion Paper (January 2006), <<http://ssrn.com/abstract=730907>>.

originally unintended by their lawmakers,¹⁰⁶ and for not having contributed to any significant extent to the decrease of the piracy phenomenon. Their exceptions have also been criticized for falling short of traditional copyright exceptions as well as being too narrowly crafted.¹⁰⁷ More importantly, it has been argued that anti-circumvention rules have introduced in practice a new exclusive right to control access to protected works by incorporating provisions that restrict circumventing acts or devices that target access control TPMs or TCs.¹⁰⁸ In conclusion, the law of code, as it is represented today in the novel field of anti-circumvention law, is one-dimensionally orientated towards the enhancement of protection and the legal shielding of private choices in code. It systematically neglects both public policy and A2K objectives.

Consequently, the combined layers of the current system of control exert protection on information, knowledge and culture that is contrary to the philosophy, aims and function of copyright law and goes far beyond its scope. As Kamil Koelman observes,¹⁰⁹ this protection is broadened in two ways: it is more variable and it makes greater use of information than under copyright law. In particular, clauses in usage contracts, which extend protection to non-copyrightable material, may be forced upon users by DRMs and TCs. Even if anti-circumvention provisions do not prohibit the circumvention of TPMs that protect such material,¹¹⁰ the burden of circumventing these TPM falls to the user without any implications for the content provider. Furthermore, apart from the fact that the user has to go through a series of acts in order to gain access, which in the absence of DRMs or TCs is unrestrained, circumvention becomes even more difficult, since the general ban against circumventing devices continues to be in force. In addition, in cases where protected and unprotected material is mixed in intellectual works,¹¹¹ circumvention of TPM that protect them will probably be deemed unlawful, even if the circumventing act takes place so as to gain access to non-copyrightable information.

However, apart from enclosing more types of information and thus undermining the public domain, the combined layers of the system tend to control permitted types of usage, which were previously at the discretion of

106. In several court cases the DMCA provisions have been invoked to stifle the right of free expression and chill scientific research, to diminish or even eliminate the fair use limitations of copyright law, to impede competition and to ban even harmless network access. (See Electronic Frontier Foundation *et al.*, "Digital Rights Management: A failure in the Developed World, A Danger to the Developing World," Paper Presented for the ITU-R Working Party 6M Report on Content Protection Technologies (2006), <http://www.eff.org/IP/DRM/itu_drm.php> [Electronic Frontier Foundation, "Digital Rights Management"]). Case law regarding the EUCD is still scarce, since the implementation process of the Directive in the Member States is ongoing or just finishing.

107. See Pamela Samuelson, "Intellectual Property and the Digital Economy: Why the Anti-Circumvention Regulations Need to be Revised," (1999) 14:2 *Berkeley Technology Law Journal* 519–566, <<http://people.ischool.berkeley.edu/~pam/papers/Samuelsont.pdf>> at p. 537; and Kamil Koelman, "The Protection of Technological Measures vs. the Copyright Limitations" (17 July 2001), Paper Presented at the ALAI Congress Adjuncts and Alternatives for Copyright, <<http://www.ivir.nl/publications/koelman/alaiNY.html>>.

108. Jane C Ginsburg, "From Having Copies to Experiencing Works: The Development of an Access Right in US Copyright Law," (2003) 50 *Journal of the Copyright Society of the USA* 113–131, <<http://ssrn.com/abstract=222493>>; and Thomas Hoeren, "Copyright Dilemma: Access Right as a Postmodern Symbol of Copyright Deconstruction?" in Becker, Buhse, Günnewig and Rump, *Digital Rights Management*, *supra* note 40, at pp. 574–586.

109. Kamil Koelman, "The Public Domain Commodified: Technological Measures and Productive Information Usage," in Lucy Guibault and Bernt P Hugenholtz, eds., *The Future of the Public Domain: Identifying the Commons in Information Law* (Kluwer Law International, 2006) 105–119, <<http://ssrn.com/abstract=895642>>.

110. As is the case of the EUCD (see *EU Copyright Directive*, *supra* note 33, at art. 6(3)).

111. For example, in databases.

the user under copyright law. Traditional copyright law grants control over the protected work, with regards to specific types of usage including its reproduction or its availability to the public. Other types of usage, those which were previously almost impossible to control in the “tangible” world such as the consumption and the private usage of the work, were left unrestrained for the user. However, DRMs and TCs in combination with usage contracts, make possible the control over every type of usage, whether it is granted as an exclusive right under copyright law or not. In this way, the *ad hoc* access right, introduced by the layered technological system of control, eliminates the non-excludable character of intellectual goods and results in their perfect commodification. The assumption that the world is evolving into a pay-per-use culture, in which A2K will be totally commercialized and granted only to the economically powerful few, may not prove to be an exaggeration in the slightest.

In conclusion, the aforementioned system appears to establish private code as the law of networked “space” by giving, in practice, an exclusive privatized right of controlling access and use of information, knowledge and culture to content providers without exceptions and restrictions – in complete contradiction to copyright law and A2K policies. It could be claimed that the perfect control of intangible goods, which is transferred by the new right, is closer in form to the kind of control exerted on tangible property granted by the trespass doctrine. In this respect, the world would appear to be marching towards a kind of information feudalism in the networked information society,¹¹² where rules are invented and enforced by corporate rights holders with the backing of the state. Thus, the system of control described above fundamentally contradicts the well-established intent of copyright doctrine, which aims to guarantee not only the rights of authors but also those of users, in order to make sure that A2K doctrines are respected in the networked world.

3.3. *Implications in the Networked Information Society*

The existing equilibrium between control and A2K, as it is interpreted in the aforementioned patterns of interrelation between code and law, pushes the networked information society in a direction that seems to inhibit, rather than encourage, exploitation of its vast potential. The currents of control in code and law tend to have perverse effects on information production and diffusion, while distributive injustice in the contemporary model of knowledge governance tends to increase informational, social and economic divides across the globe. A supplementary shift in traditional power relations can be observed, one which favours the domination of certain powerful private interests in the networked information society and has worrying consequences in the public sphere. These developments appear to be in contradiction with the unique opportunity for social and economic development given by the rise of the networked world. Therefore, what is urgently needed is a change in mentality to readjust the lost balance in future equilibria.

Although the general absence of decent scientific analysis has resulted

112. The term “Information Feudalism” was coined by Peter Drahos and John Braithwaite. See Drahos and Braithwaite, *Information Feudalism*, *supra* note 21.

in a lack of empirical evidence as to the exact effects of the current model for the governance of knowledge, it is logical to assume that the high levels of control on information, knowledge and culture, as exerted through technological and legal means, function in a way which would appear to suppress, rather than stimulate creativity.

It is a generally accepted truism that innovation is an accumulative process both in science and in arts, and that future innovation always builds upon previous achievements.¹¹³ In this respect, efficient and productive innovation will be encouraged by the widest possible availability and diffusion of intellectual products in societies.¹¹⁴ This is exactly the purpose of the limitations on the scope of the copyright paradigm, such as the originality doctrine and limited duration, as well as exceptions such as the fair use doctrine, that attempt to ameliorate the effects of imposing exclusive rights control on information.¹¹⁵ However, as analysed above, such essential A2K mechanisms are not to be found in the current layered techno-legal system of control, since traditional copyright doctrines are displaced by the combined effects of private contracts and DRMs/TCs. Concurrently, expansion of control on more types of previously unprotected information significantly impinges upon the public domain.¹¹⁶ As a result, these combined developments logically lead to the suppression of subsequent creativity and a decrease in the production of information.

It could be argued, however, that the commercialization of more types of information and control without exceptions does not stop information production, but rather changes the nature of innovation. A2K still exists (of course), but it is completely commercialized, and information is available, but on the basis of compensation. In such a reality, information, knowledge and culture continue to be produced, but they become monopolized by those innovators who can afford to access them. The result is that everybody else is excluded from the game of creativity and the quantity and quality of produced information suffer severe consequences. More importantly, knowledge and culture in such a dystopian vision become commodities that are manipulated by powerful private actors.

The dystopia of perfect control on information described above has not yet been realized, but the current model for the governance of knowledge would appear to point in that direction. Signs of the change are already evident.

113. Barlow compares patterns of information with life forms: "I believe they are life forms in every respect but their freedom from the carbon atom. They self-reproduce, they interact with their surroundings and adapt to them, they mutate, they persist. They evolve to fill the empty niches of their local environments, which are, in this case the surrounding belief systems and cultures of their hosts, namely, us." John P Barlow, "The Economy of Ideas," (March 1994) 2:03 *Wired Magazine*, <<http://www.wired.com/wired/archive/2.03/economy.ideas.html>>.

114. In economic terms, innovation is a process in which information, knowledge and culture are its input as well as its output, and therefore, the more widely these elements are available in a society, the greater and better the output of innovation will be.

115. See Section 2.4 above.

116. For the importance of the public domain as an essential source of innovation see "The Public Domain," (2003) 66:1-22 *Law and Contemporary Problems*, <<http://www.law.duke.edu/journals/journaltoc?journal=lcp&toc=lcptoc66winterspring2003.htm>>. Appropriation of types of information, such as ideas, facts or data, which traditionally belong to the public domain and are the most important input of innovation, may result in the serious hampering of creativity. In Joseph Stiglitz's words "[i]deas are the most important input into research, and if intellectual property slows down the ability to use others' ideas, then scientific and technological progress will suffer." See Joseph Stiglitz, "Intellectual Property Rights and Wrongs," (2005) *Project Syndicate*, <<http://www.project-syndicate.org/commentary/stiglitz61>>. Through the aforementioned techno-legal system of control, the enclosure of facts or other types of data is possible and the access to ideas themselves open only with remuneration.

The layered techno-legal system of control raises barriers that inevitably slow down and even harness the information flowing through the networks of the modern world. Traditional societal mechanisms for public access to and diffusion of knowledge in societies, such as libraries, archives and information repositories, are all affected by the increased commercialization of knowledge.¹¹⁷ Additionally, alternative means of information production that have arisen in the matrix of the networked information society and provided us with an unlimited wealth of information appear to be threatened.¹¹⁸ Furthermore, educational facilities are forced to increase their budgets in order to cover their expenses,¹¹⁹ while the culture of sharing knowledge within science is severely threatened with obvious ramifications for its potential progress.¹²⁰ Finally, there are reported cases of unjustified censorship either via the use of code or via the manipulation of law, in which freedom of speech is suppressed according to the biddings of those who control knowledge.¹²¹

The implications of this model do not concern only information production and diffusion in a strict economic sense; they also tend to adversely influence societies. Increased global control and the eventual appropriation of information, knowledge and culture without efficient A2K mechanisms will either widen already existing educational, social and economic divisions, or create new ones, at both national and international levels. Undoubtedly, the commercialization of once free A2K mechanisms and the enclosure of previously free types of information do not privilege those lacking sufficient funds to get informed or educated. The "digital divide," as it is called, automatically creates further inequalities in opportunity and is rapidly translated into social and economic divides between populations and nations with little chance for the information-poor to develop and compete with

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117. Due to the current system of control, libraries tend to encounter great difficulties in exercising their lawful rights and benefiting from copyright exceptions in the digital environment. (See Electronic Frontier Foundation "Digital Rights Management," *supra* note 106). Furthermore, preservation and archiving of information, knowledge and culture becomes more difficult and complicated. See Carsten Orwat, "Report on the 4th INDICARE Workshop: Digital Rights Management in Public Science," (2006), <http://www.indicare.org/tiki-download_file.php?fileId=176> at pp. 16–17.
118. Non-commercial peer production is only possible in a knowledge governance system with a robust public domain and wide, distinct A2K mechanisms. The more these elements deteriorate and our culture is commercialized, the less information production will come from these important sources of production. More clear and particular threats can be seen: for example, the incompatibility of FLOSS with technological means of protection, such as CSS, may lead to its marginalization if an adequate solution is not found.
119. Technologies of control tend to commercialize educational materials without regard for copyright exceptions. In addition, they tend to create impediments to the use of digital media and the exchange of educational materials, especially for distance educators and learners.
120. Paul David notes that "[h]igh access charges imposed by holders of monopoly rights in intellectual property have overall consequences for the conduct of science that are particularly damaging to programs of exploratory research which are recognized to be critical for the sustained growth of knowledge-driven economies. Lack of restraint in privatizing the public domain in data and information has effects similar to those of non-cooperative behaviors among researchers, especially in regard to the sharing of access to raw data-streams and information, and the systematic under-provision the documentation and annotation required to create reliably accurate and up-to-date public database resources. Both can significantly degrade the effectiveness of the research system as a whole." See Paul A David, "Koyaanisqatsi in Cyberspace: The economics of an 'out-of-balance' regime of private property rights in digital data and information," (March 2003) 02:029 Stanford Institute for Economic Policy Research – Discussion Papers, <<http://siepr.stanford.edu/papers/pdf/02-29.pdf>> at p. 2.
121. This is proven by several incidents in the USA, where the anti-circumvention rules of the DMCA have been repeatedly used to stifle free speech and legitimate scientific research. See Electronic Frontier Foundation, "Unintended Consequences: Seven Years under the DMCA" (2006), <http://www.eff.org/IP/DMCA/20030102_dmca_unintended_consequences.html> at p.2 [Electronic Frontier Foundation, "Unintended Consequences"] for analysis on relevant cases, such as the 2600 magazine lawsuit and the cases of Professor Edward Felten and the Russian programmer Dmitry Sklyarov. See also Ian Kerr and Jane Bailey, "The Implications of Digital Rights Management for Privacy and Freedom of Expression," (2004) 2:2 *Journal of Information, Communication & Ethics in Society* 85–95, <<http://ssrn.com/abstract=705041>>.

the information-rich. Furthermore, the current model of knowledge governance, which is imposed on a global scale, eliminates topical governance models in the developing world, even though they tend to correspond better with the needs of local societies and to implement more effective policies for local development.

The consequences of this model for the underprivileged also expand into previously unimagined areas, widening exclusions and divides. Technologies of control normally presuppose infrastructure essential for their function; infrastructure that is basically absent in the South, but present in the North. Furthermore, they largely prohibit the lending or resale of protected works, thereby eliminating second-hand goods markets which are of major importance for the information-poor. In addition, deployed DRMs and TCs often prejudice A2K against disabled persons by cancelling relevant copyright exceptions in the networked information environment and thus condemning this sensitive segment of society to information poverty. All of these observed developments stand in tragic contrast to the capacity of modern networks for conveying and diffusing information without temporal and spatial restrictions, and to the potential of the networked information society for social and economic cohesion and development.

Nevertheless, the most important implication of the current model is the radical shift in power relations that is taking place between states, private actors and society. What raises the importance of the knowledge governance debate is the undeniable fact that granting exclusive rights on information forges power relationships, and, due to the particular characteristics of information, knowledge and culture, it does this very differently than the way in which exclusive ownership rights of tangible elements are granted. Such power relations are created between the holders of these rights, either innovators or content providers who control certain types of usage of the owned intellectual works, and users, who must request permission for usage. Future innovators, who fall under the users' category, essentially need access to and use of existing intellectual achievement in order to arrive at their own intellectual creations. The degree of control of knowledge and culture influences their future development as a result, and, given the great expansion of the scope of protection and the elimination of copyright A2K mechanisms, there is an imminent danger that powerful private actors may take complete control and finally manipulate the present and future of creativity with manifold negative effects for society.

Furthermore, the current knowledge governance model gradually changes the power relations between states and the private commercial sector. Power in contemporary networked information society is rapidly being accumulated and transferred from states or societal communities and organizations to private hands to the detriment of democracy and public discourse.¹²² This happens in two ways:

122. In defining the interrelations between technology, law and economics, Johannes Ulbricht states that "technology imparts to whoever controls it possibilities for action and thus endows him with de facto decision-making power. By comparison, economics deals with how, as a player, one makes the best possible use of this decision-making power. At the same time, economic criteria also decide how the technology is further developed. The law, on the other hand, stabilizes and corrects the distribution of technical and economic power and makes statements as to how the decision-making power should be distributed." See Johannes Ulbricht, "Business, Technology and Law – Interrelations of Three Scientific Perspectives on DRM" in Becker, Buhse, Günnevig and Rump, *Digital Rights Management*, *supra* note 40, at p. 596. Yet, in the context of Ulbricht's model, it is the law of code, especially anti-circumvention laws, which today fails in its role of distributing the decision-making power in accordance with fundamental principles of our democratic systems of governance.

firstly, the owners of code construct networked space via technologies of control and secondly, as a corollary, the rules of the digital environment are invented, imposed and automatically enforced by these private commercial actors. These policies of control are constructed in isolation from public discourse and are formulated solely according to the interests of their architects. Consequently, these rules and policies do not implement real laws; on the contrary, they are made-up laws, devoid of equilibrium between private and public interests, as is the case with copyright. In this way, the networked information society is gradually transformed into a pay-per-use environment. Therefore, the future "Leviathan" may not be the state,¹²³ but an extremely powerful cartel of private corporations that simply own the place and transform its architectures according to their appetites.¹²⁴

In the struggle for dominance in the new environment, two other important conflicts can be identified with regard to power relations between states themselves and between actors in the market. In the age of globalization, as far as the relations between states are concerned, it could be claimed that the existing status of the governance of knowledge is an effective mechanism for the preservation of existing inequalities of power and wealth between the North and the South. Evidently, under the prevailing political and legal regime, access by the South to the wealth of knowledge owned by the industries of developed states on affordable terms, and chances for rapid progress and competitiveness on a global level, become abstract concepts. The more the commodification of information, knowledge and culture is promoted and the more the local knowledge governance models in developing states are displaced by the dominant global model, the narrower the margins of the infant knowledge industries of the latter will be.¹²⁵ But the current global model is more than apt in preserving the *status quo* in markets between "old," incumbent players and newly emergent market actors. DRMs and TCs would appear to have an anti-competitive effect on the knowledge industries, as there are cases where widely used DRM and TC standards are utilized to exclude competitors and inhibit

123. It should be noted at this point that states and governments were never actually the "leviathans" of the networked information society, despite their recently aroused interest to regulate it. To many, this absence of state interventionism accounts for the rise and the rapid development of the internet phenomenon. Yet, even though state intervention in the new environment is usually dealt with scepticism, the displacement of public policies by private powers may require a narrow, focused and effective involvement of governments, as the primal representatives of the public interest in order to reconstruct balance.

124. Richard Stallman vividly illustrates this phenomenon: "Allowing a few businesses to organize a scheme to deny our freedoms for their profit is a failure of government, but so far most of the world's governments, led by the U.S., have acted as paid accomplices rather than policemen for these schemes. The copyright industry has promulgated its peculiar ideas of right and wrong so vigorously that some readers may find it hard to entertain the idea that individual freedom can trump their profits." Richard Stallman, "Opposing Digital Rights Mismanagement," (2005) *BusinessWeek Online*, <<http://www.gnu.org/philosophy/opposing-drm.html>>.

125. In the same manner, Susan Sell identifies this narrowing of margins as thus: "This far reaching agreement has important implications for innovation, research, and development, economic development, the future location of industry and the global division of labour. Indeed, the dramatic expansion of the scope of IP rights embodied in TRIPS reduces the options available to future industrializers by effectively blocking the route that earlier industrializers followed. It raises the price of information and technology by extending the monopoly privileges of right-holders and requires states to play a much greater role in defending them." Susan Sell, *Private Power, Public Law: The Globalisation of Intellectual Property Rights* (Cambridge University Press, 2003) at p. 9.

healthy competition.¹²⁶ This anti-competitive effect usually surfaces as an effort of the “old” to stifle the “new” in cases when exclusive rights of control are put forward by powerful players in the knowledge industries in order to suppress the commercial exploitation of new technological applications beyond their control. In many cases, this will of course act as a fetter on technological progress.¹²⁷

In conclusion, it is obvious that the question of how knowledge should be governed extends into the much wider issue of how the networked information society has to be governed in general. The global governance model described in the previous chapters appears only superficially to serve aims that protect against the phenomenon of piracy. On the contrary, it is more commonly utilized as a means of gaining dominance in, and determining the identity and future of, the networked world. The feasibility of such a model is highly questionable due to its many implications and its failure to address the potential of ICT for social and economic development. Therefore, there is an urgent need in our era for a reconceptualization of the political economy of the networked information society, commencing from a more equitable equilibrium between A2K and control.

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4. KNOWLEDGE GOVERNANCE IN THE DIGITAL AGE

INFORMATION, KNOWLEDGE AND CULTURE ARE THE LIFEBLOOD of the networked world. Although the networked information society is extremely complex, with its governance involving infrastructural, legal, economic, developmental and socio-cultural issues, it is ultimately the nature of the content that is conveyed and delivered, and the ways in which this is conducted that constitute its very essence.¹²⁸ As a result, governance of knowledge in the digital age lies at the heart of, or even characterizes, the governance of the networked information society as a whole.

The current regime for the governance of knowledge and, consequently, for the governance of the networked information society in general, fails to address the potential for social and economic development in this era. Our times call for a shift in policies and decision-making. Political will should harmonize the currents of control in code and law with the current of A2K, and give rise to the next equilibrium. A new political economy of the networked information society ought to be determined so that power in the new environment can be distributed

126. In regard to the DMCA, Timothy B Lee writes “The DMCA is anti-competitive. It gives copyright holders—and the technology companies that distribute their content—the legal power to create closed technology platforms and exclude competitors from interoperating with them.” Timothy B Lee, “Circumventing Competition: The Perverse Consequences of the Digital Millennium Copyright Act,” (21 March 2006), The Cato Institute—Policy Analysis no. 564, <http://www.cato.org/pub_display.php?pub_id=6025>. On the implications of DRMs in competition in the EU, see Reckon LLP, “The iTunes Music Store: Does Competition Hold the Key to a Closed Shop?” *Reckon Report* (September 2004), <www.reckon.co.uk/ReckoniTunesSep2004.pdf> [Reckon LLP, “The iTunes Music Store”].

127. See Lessig, *Future of Ideas*, *supra* note 14, at ch. 9.

128. Governance of the networked information society has direct relevance to the continuing debate surrounding internet governance. However, the two terms are not identical, as the former aims to cover the governance of all forms of electronic communication, the latter strictly concerns communications based on the internet protocols (more similarities are shared with the term global ICT governance). The fact that the TCP/IP protocol forms the basis of the internet tends to prevail in all ecommunications, but that is not to say that the internet accounts for all the effects that information and communication technologies have on our lives. Nevertheless, this paper draws on valuable material and also aims to contribute to the ongoing internet governance debate in a broad sense.

fairly and in accordance with democratic and participatory values.¹²⁹

The next equilibrium should take advantage of that potential. In Hal Varian's words, "[u]niversal access to all the world's information is technologically possible now; the missing piece is the legal infrastructure that will provide the incentives to make such access economically viable."¹³⁰ In this sense, code and law should aim to ensure respect for the rights of both innovators or content providers and users, but with a cross-cutting priority of serving and pursuing the public interest. Thereby, laws should be reformed to guarantee users' rights, and specific principles should be incorporated into code in order to guarantee the implementation of strategic public policies in the structure and the function of the networked world. In such an equilibrium, control on information, knowledge and culture will of course play a central role, but in alignment with A2K aims and principles. Finally, in the process of constructing the next equilibrium, both the globalized nature of the networked information society and its localized particularities should be given equal consideration.

4.1. The Next Equilibrium

A common fallacy observed in contemporary policy choices is the conceptualization of the networked information environment as an utterly commercialized and proprietary space, while generally the opposite is true. Although commercial activity has developed immensely on the net since its genesis, even today only a very limited portion of the space is commercialized, strictly following market rules. Its greatest part, in terms of content or information production and distribution, in fact remains dominated by non-market rules. Based on voluntary peer contribution and enabled by the technologies of freedom that characterize the architecture of the networked world, this decentralized non-market production of information constitutes the potential of the networked information society. Interventionist policies, which aim to severely alter the code and architecture of the space and impose great barriers to flowing information, ignore this reality and consequently jeopardize such production.¹³¹

The next equilibrium must be forged in such a way that takes into account and encourages both market and non-market based information production. In order to discover the best possible balance, an instrumentalist approach is needed, which will determine policies according to their effectiveness with regard

129. In spotting this lack of a clearly delineated political economy on the governance of knowledge, James Boyle argues: "[l]ike most property regimes, our intellectual property regime will be contentious, in distributional, ideological and efficiency terms. It will have effects on market power, economic concentration and social structure. Yet, right now, we have no politics of intellectual property in the way that we have a politics of the environment or of tax reform. We lack a conceptual map of issues, a rough working model of costs and benefits and a functioning coalition-politics of groups unified by common interest perceived in apparently diverse situations. ... It is intellectual property, not the regulation of cyber-smut, that provides the key to the distribution of wealth, power, and access in the information society." (Boyle, "Politics of IP," *supra* note 48, at pp. 88–89).

130. Hal R Varian, "Universal Access to Information," (2005) 48:10 *Communications of the ACM* 65–66, <<http://www.ischool.berkeley.edu/~hal/Papers/2006/univ-access-info.pdf>>.

131. It is logical to assume that the more commercialized the networked information environment becomes the less such alternative ways of producing information will be able to flourish. Examples that support the aforementioned assumption can be found in all aspects of the environment. Overly restrictive copyright laws are a menace to the rising "mix" culture of the net as DRMs or TCs that are incompatible with FLOSS may have a devastating effect on its development and rigid regulation of hyperlinks tend to impede the functionality of the space. Due to its possible impact on non-market information production, the current model, which evangelizes almost perfect commercialization of information, ought to be reformed.

to the enhancement of information production and diffusion. The extent of their effectiveness should, in turn, not be unjustifiably judged, but should be assessed on the basis of decent scientific analysis, with adequate empirical evidence and theoretical justification. In such a model, neither policies of control, nor policies of access to information should be imposed as ends in themselves. Rather, the model requires that there be a provision of adequate proof of the necessity of such policies, the burden of which should essentially fall on those who propose them.

In addition, reform of the current model of knowledge governance should be orientated towards a more equitable distribution of information, knowledge and culture within individual states and worldwide. Elimination of the divisions between information "rich" and information "poor" is essential for an inclusive and participatory networked information society and a prerequisite for human flourishing.¹³² From that perspective, control on information is permissible, but only so long as it serves the objective of improving the position of the information-poor in society.¹³³ In fact, control through law or technology is, as noted above, a very effective mechanism for motivating innovation and increasing information production and is, in this sense, making more information more widely available to the public. In this respect, control is employed as a means to protect rights holders' interests against unauthorized copying and distribution, but also against free-riding competition and as a means to ensure trust in the networked information environment. However, control at levels that overly undermine A2K and function to the detriment of the least privileged members of society is unacceptable, for it does not serve the principle of justice.¹³⁴ Lastly, even though the reformed model will be inevitably globalized, it may also tolerate the evolvement of more localized policies of knowledge governance, which address local particularities more efficiently. If regional or national differences in terms of social or economic development are ignored and a universal centralized regime is constructed, this will give rise to new tensions and inequalities in the governance of knowledge. Yet, a balance between globality and locality should be kept, so that regional, national or local policies do not fragment the robustness and homogeneity of the networked information society.

The aim and promotion of a more equitable networked information society also has a close relationship with A2K. Universal A2K for all that does not undermine private rights on information is possible if, on the one hand, A2K mechanisms of the copyright paradigm are preserved, their practical efficiency is further enhanced and, on the other hand, novel A2K doctrines are introduced, whenever needed. More importantly, the contemporary status of copyright

132. It is not questioned though, that the most important facet for achieving inclusiveness in the global networked information society and the prerequisite for A2K is the issue of capacity building in global ICT. It is roughly estimated that out of the six billion people in the world, only 600 million currently have access to the internet, the most important ICT. Unless this disappointing reality changes, we cannot seriously argue about inclusiveness.

133. This conception of justice is directly derived from the second justice principle of the Rawlsian *Theory of Justice*, according to which "[s]ocial and economic inequalities are to be arranged so that they are ... to ... the greatest benefit to the least advantaged...." John Rawls, *A Theory of Justice* (Harvard University Press, 1971) at p. 302.

134. "[E]xclusive rights in ideas or expressions, or for that matter in communications infrastructure, are unjustifiable to the extent that they are not plainly necessary to sustain productivity and growth. In Rawls' framework, we would not justify exclusive rights in information, culture, or communications facilities if doing so would raise the cost of access, unless we knew that doing so would increase productivity so as, given appropriate redistribution, to improve the condition of those worst off in society." Benkler, "Freedom in the Commons," *supra* note 56, at p. 1270.

limitations and exceptions, and other A2K mechanisms is rather vague and inefficient¹³⁵ as they are more often provided in practice by rights holders as a privilege rather than as a right. In addition, in most jurisdictions there is a lack of clarity as far as the relationship between copyright exceptions and contractual agreements is concerned. Therefore, A2K could be more clearly delineated through the establishment of a law of users' rights both at the international and national level¹³⁶ in a way that would clarify the obligations of rights holders and would significantly simplify and improve the A2K process. The draft Treaty on A2K allegedly moves in that direction.¹³⁷

As noted above, control on information as a concept should have a central role in the next equilibrium both in law and technology. Technologies of control, such as DRMs and TCs, have naturally evolved as a more effective means of safeguarding legitimate rights in the absence of effective law enforcement in the networked space.¹³⁸ They could also be compared to measures of self-enforcing legal rules in the tangible environment, such as locks and fences on private property, and their function is crucial for the viability of business models in the new environment. But this role will have to be re-conceptualized to reform abnormalities in the political economy of the networked information society. The law must redeem its primacy from code in determining the rules of the environment and allocating power. To achieve this, the law of code should not just passively empower private choices in code, but instead should be actively orientated towards posing obligations upon its controllers. In this way, decision-making and policy-planning powers will not be exerted by powerful private market actors, as may be the case with the current regime. Similarly, DRMs and TCs will not be utilized solely for control, but principally for the management of information, so that none of the interests of the groups involved, namely creators, content providers and users, are discriminately undermined.

4.2. Principles Embedded on Code

The fields of law that have a strong relationship with the regulation of code mainly involve copyright and contract law, anti-circumvention rules, technology licences and, in some cases, consumer protection law. In the techno-legal system of control described above, these fields of law interact with technology and are structured together in layers of protection. Accordingly, the rules of how information is protected in such a system are primarily determined by contract law either in the

135. At an international level, provisions which oblige states to legislate specific copyright limitations and exceptions are almost totally absent (see *supra* note 62). Accordingly, international mechanisms like compulsory licensing are also extremely complex and time consuming to the extent that they are in the end self-cancelled (proof of that are the very few cases where international compulsory licensing provisions are invoked). At a national level, in some cases A2K mechanisms are unclear and create legal uncertainties (for example, the fair use doctrine), while in other cases the threat of litigation deters users from evoking them.

136. See Okediji, "Sustainable Access," *supra* note 36, at pp. 181–182.

137. Treaty A2K, *supra* note 51.

138. "DRMs are necessary to bring exclusion to digital IP goods. They are the only means to enable the exclusiveness of intellectual property rights and consequently, the sufficient incentives to create. While they restrict the short term consumers' benefits of cultural goods free diffusion, they insure their long term welfare by enabling these cultural goods to be financed and produced in the future." Olivier Bomsel and Anne-Gaëlle Geffroy, "Economic Analysis of DRMs Roll – Out over the Internet," (10 March 2005) *Indicare Monitor*, <http://www.indicare.org/tiki-read_article.php?articleId=84>. DRMs are also a technology in flux. Their possible future uses are still unknown. Their utilization by creators in order to ensure adequate remuneration for their work through direct transactions with consumers may change forever the way knowledge is governed in our societies.

form of usage contracts or in the form of technology licenses. In the digital age, the primacy of contract law and the subsequent gradual displacement of copyright law is nevertheless a negative development. Therefore, a first step in reforming the law of code in the networked information society is the legislation of efficient rules to clarify the interface between these two fields of law. In addition, due to the importance of knowledge, information and culture for societies and economies, and the fact that the unilateral imposition of rules by powerful private contracting parties on how to govern these crucial elements is a rebuttable perspective, these rules ought to establish the primacy of copyright on contract law in cases where public interest issues are at stake.¹³⁹ More particularly, whenever contractual agreements, either between rights holders and users, or between stakeholders of the content and the manufacturing industries, are utilized to cancel copyright limitations or exceptions and even to expand protection on non-copyrightable material, these specific contractual clauses should be annulled and overridden by the relevant copyright rules for prevailing public interest reasons. It could be argued that such a statutory intervention is extreme because it unacceptably limits contractual freedoms, or that a knowledge governance model based on contract law is more appropriate in the digital age. But then one must wonder whether there is indeed a reason for the existence of copyright exceptions or limitations in the networked information environment, in which all types of information are being transacted on the basis of shrink- or click-wrap contracts.

A second step in the reform of the law of code must focus on anti-circumvention rules and technology licences. These additional layers of protection are essential for the legal empowerment of DRMs and TCs and their wide dispersion in the networked information environment. Nevertheless, they may also be used for the displacement of copyright limitations and exceptions or for the control over more types and usages of intellectual works not provided under copyright. Technology licences may, for example, impose contractual obligations on hardware or software manufacturers to produce devices with embedded technologies of control, which incorporate policies that undermine copyright rules. In such cases the law should intervene, as in usage contracts, and annul the relevant contractual clauses in order to guarantee respect of copyright rules in the code and architecture of the networked world.

Similarly, anti-circumvention laws should be reformed in order to protect only DRMs and TCs that adhere to copyright rules. In cases where DRMs and TCs exert control which surpasses copyright protection, their circumvention should not be outlawed.¹⁴⁰ However, such a solution has its limitations. Users, deprived of their legitimate access to knowledge, may not have the skills to conduct acts of circumvention. Consequently, because they will inevitably be forced to turn

139. Contractual freedom is a basic component of individual freedom and autonomy. It is also a very effective mechanism of regulating relations between individuals in the most productive way for the promotion of their interests and a fundamental element of decentralized capitalistic economies. However, the principle of contractual freedom presupposes certain conditions, such as healthy market competition or fairly equal bargaining power, in order to function ideally in societies and economies. Furthermore, it is not always an adequate mechanism to address wider issues with regard to the public good. In cases where pathogenous phenomena appear or in cases where public interest objectives are to be promoted, state intervention is essential.

140. This creates a so-called "right to hack" (Bechtold, "Digital Rights Management," *supra* note 100, p.372, described also by Lawrence Lessig (Lessig, *Code*, *supra* note 69, at p. 139) as the "Cohen theorem" (see Julie Cohen, "Some Reflections on Copyright Management Systems and Laws Designed to Protect Them" (1997) 12:1 *Berkeley Technology Law Journal* 161-187, <<http://www.law.georgetown.edu/faculty/jec/reflections.pdf>>).

to circumvention tools, it is logical to consider statutorily lifting the ban from such devices, when they are used for legitimate circumventing. This assumption creates further problems, however, as there are no devices which can only be used for legitimate circumventing alone, on the one hand, while, on the other, it is impossible to know *ex ante* whether they will be only lawfully used. This vicious circle reveals the various complexities of the DRMs and TCs problem, and although possible solutions have been proposed,¹⁴¹ none seems efficient enough to guarantee unfettered A2K for users. The claim can be made that technologies of control prejudice A2K mechanisms in such a way that no legal placebo exists to restore the initial status of the networked information society before their introduction. An alternative proposal, which might alleviate these ramifications, could be the combined imposition of, on the one hand, an obligation for content providers to provide circumvention tools to users in cases where their DRMs and TCs bar legitimate access and usage of protected works, and, on the other hand, the imposition of a redress mechanism through litigation in cases where content providers unjustifiably refuse to provide such solutions.

Reform of anti-circumvention rules should combine various different A2K policies in order to ameliorate their effects to the greatest extent. Amelioration could also relate to remedies and sanctions for circumventing acts and devices. Such measures of enforcement should follow the principle of proportionality, thus rejecting the notion of a "one size fits all" penalty for all types of actors and outlawed behaviour and providing escalating measures in proportion to the gravity of the offensive acts.

However, there is a clear need to legislate a new field of law devoted to the regulation of code, a law of code. This will go beyond the boundaries of anti-circumvention rules or copyright law and directly address issues that arise in the context of code and architecture. Such a field of law must essentially adhere to the principle of deregulation as ostensibly its most appropriate principle in the regulation but not the harnessing of technology. As a result, there should be no mandate provisions of any kind for compulsory implementation of specific types of technology, either for enabling access or for imposing control on knowledge.¹⁴² On the other hand though, law may intervene to impose obligations on code controllers and thus, mould code in an indirect and technology-neutral way, inasmuch as it does not have a stifling effect. In particular, certain consumer protection rules may by necessity have to be implemented in code, as a means of balancing differences in bargaining power between rights holders and consumers, and addressing particularities of shrink- or click-wrap licences that inevitably arise in the networked information environment.¹⁴³ Firstly, a statutory right of

141. For example, the "fair use infrastructure" model proposed by Dan Burke and Julie Cohen, "Fair Use Infrastructure for Rights Management Systems," (2001) 15 *Harvard Journal of Law & Technology* 41-83 and the similar "key escrow" solution proposed by Bechtold in "Digital Rights Management," *supra* note 100, at p. 374. Article 6(4) of the EUCD obliges Member States to intervene in favour of users, when their legitimate A2K is undermined, but the vagueness and complexity of the relevant proviso renders it inadequate to solve the problem. See *EU Copyright Directive*, *supra* note 33, art. 6(4).

142. See US DMCA and US AHRA *supra* notes 33 and 73 for the mandate provisions in regard to technologies of control which appeared in the past and are proposed for the future. Such interventionist policies are based on assumptions that ignore the unstable technological flux and are always bound to produce stifling effects.

143. The nature of DRMs and TCs and the inadequacies of general consumer protection law to deal with certain issues in the networked information environment justify the legislation of such sector-specific consumer protection rules.

withdrawal may be appropriately granted in cases of unilateral change of the contractual terms by the rights holder. Secondly, appropriate disclosure of the existence and the types of DRMs and TCs incorporated in the purchased material is an essential legislative measure, to ensure transparency for consumers, to reduce misleading information and to encourage competition between DRM and TC vendors.¹⁴⁴ Lastly, a mechanism of redress for consumers, apart from possibly existing mechanisms in generic consumer protection law, may be considered in cases of unfair contractual terms enforced by DRMs and TCs.

Another possible intervention may be needed in terms of open standards policies. Cases have been reported where closed technological platforms with the protection of anti-circumvention rules have been used with the aim of excluding competitors and of stifling competition in the markets.¹⁴⁵ The fact is that currently deployed DRMs are based on proprietary standards, which are often made non-interoperable with each other. Furthermore, anti-circumvention rules generally outlaw reverse engineering of DRMs for commercial benefit, which could otherwise permit competitors to develop competing interoperable products. The combined result of these is a regime which encourages incumbent players to create and impose closed DRM platforms as a means towards dominating markets. Existing US antitrust laws and EC competition laws have proved ineffective in regulating such distortions¹⁴⁶ and legislative initiatives may be necessary to redress the problem. A possible solution may follow the model employed in telecommunications law, namely a combination of *ex ante* sector specific regulation on DRMs and TCs and *ex post facto* generic competition law.¹⁴⁷ Sector specific regulation could incorporate obligations for DRM and TC providers to provide technical information about their products to competitors, in order to achieve interoperability.¹⁴⁸ It could also grant a clear reverse engineering exception for legitimate competitors on anti-circumvention

144. "In order to ensure consumer choice, users must be informed if a product or service is protected by technological measures." Gasser, "Legal Frameworks," *supra* note 77, at p. 51.

145. See Electronic Frontier Foundation, "Unintended Consequences," *supra* note 121, at p. 8.

146. For analysis regarding EC competition law and DRM (art. 82 EC Treaty) see Reckon LLP, "The iTunes Music Store," *supra* note 126. See also Giuseppe Mazziotti, "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?" (2005) 5:2005 Berkeley Centre for Law and Technology, <http://repositories.cdlib.org/bclt/lts/5/> [Mazziotti, "Did Apple's Refusal Constitute an Abuse?"].

147. The analogy between the DRMs and TCs rising market (and the software industry in general) and the telecommunications industry is not inappropriate or extreme in this context, considering the similarities of the two industrial sectors. DRMs and software in general have a particular characteristic which differentiates them from other intellectual works: namely, they are required to interoperate in order to be functional. This interoperability characteristic, inherent in their nature as intellectual works always heralds a potential risk for fair competition and is a source for market failures. In addition, it creates an advantage for incumbent players, which resembles the advantage of incumbent operators in telecommunications in terms of infrastructure. Therefore, as in sector specific regulation in telecommunications, there are rules facilitating interconnection and compromising private property rights due to prevailing public interest issues. Similarly, legislation of rules on "interoperability," which compromise intellectual property and other rights, may seem logical in relation to DRMs and TCs: see Boris Rotenberg, "The Legal Regulation of Software Interoperability in the EU," (2005) 7:05 The Jean Monnet Work Papers, <<http://www.jeanmonnetprogram.org/papers/05/050701.pdf>>.

148. Directly imposing DRM standards by law to industries is an interventionist public policy with an inevitably adverse impact on technological progress. Legislative approaches, however, which encourage standardization, may yield the same result of DRM interoperability, but in a technology-neutral and therefore much more appropriate way. The recently approved French Bill implementing the EU CD contains clauses (art. 14 of the Bill) establishing a new regulatory authority with the designated task of obliging DRM providers to submit technical information to competitors so that interoperability may be achieved. These have, however, been heavily criticized for their unclear interplay with anti-circumvention and copyright rules.

rules.¹⁴⁹ On the other hand, generic antitrust law could be invoked in extreme cases, where abuse of a dominant position is evident and compulsory licensing of DRMs and TCs is essential to correct market distortions. Finally, governments could employ purchasing policies for the public sector in support of open standards so as to strengthen their deployment in markets.

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5. EPILOGUE

IT IS EVIDENT THAT THE CURRENT MODEL FOR THE GOVERNANCE of information, knowledge and culture is inappropriate in the digital age. The equilibrium that exists between access and control does not have optimal results in terms of information production and diffusion through societies. In fact, it seems to restrict the information flows of the networked world and decrease the production and the availability of intellectual works. Code and law are used solely as tools of control, thus conferring absolute monopoly rights to their holders, whilst mechanisms for accessing knowledge that were previously open to all are being rapidly commercialized.

Until now, the networked world was a key factor for social and economic progress, not at all because of the current governance model, but principally by functioning alternatively or even in contrast to its rules.¹⁵⁰ Aside from its apparent failure in economic terms, the values of the current model have definitely failed to become acceptable in societies. Evidence can be seen in terms of widespread societal disdain.¹⁵¹ The fact that modern policies with regard to knowledge governance become more and more unpopular in society may be a sign that the current techno-legal model is increasingly estranged from the principle of justice that ought to characterize law.¹⁵² The more the law concerning the governance of knowledge is reformed in the direction of serving certain private interests to the detriment of the public good, the more unethical, unjust and coercive it will appear to large parts of the public.

One cannot be sure that the current balance will change. One can be sure,

149. As Giuseppe Mazziotti suggests, "The monopolization of DRM technology could be avoided in principle either by virtue of a permissive reverse engineering law or through the establishment of an open standard for that technology." Mazziotti, "Did Apple's Refusal Constitute an Abuse," *supra* note 146, at p. 29.

150. In practice, novel, alternative ways of producing and distributing information, which are not market-orientated in a strict sense, have been more functional and well-adapted to the nature of the environment and more adequate to address social and economic progress in the new era than the dominating legal or technological rules of control.

151. A proper analysis of piracy as a social phenomenon should not be confined to its simplistic interpretation as an act opposed to law. On the contrary, such an analysis should consider whether such widespread unauthorized copying phenomena in societies have their basis, reasons and incentives inter alia on mass disapproval of the current techno-legal system of control on knowledge and whether piracy is seen by many as a reaction and disobedience against laws that appear unfair. Such politicization of piracy is evident in many cases: for example the protests following the shutting down of the Swedish p2p site Piratebay.com. See Thomas Mennecke, "The Pirate Bay returns to Sweden" (June 15, 2006), <<http://www.slyck.com/news.php?story=1221>>.

152. One of the main objectives of law is to achieve justice, and the point of intersection between law and justice is closely related to the interaction of law production mechanisms and society as a carrier of the notion of justice in a certain time and place. Through this process, posited laws eventually reach the goal of justice and hence become socially accepted. Alienation of posited laws from the ideal of justice has undesirable consequences for the legal system and the societal functions. To the extent that a legislated system of social control falls short of its implementation of basic notions of justice, it eventually loses acceptance in society and is recognized less and less as a system of law by the members of the public, but as a tool of social repression representing partial interests rather than the public interest.

however, that future equilibria will play a decisive role in shaping the identity of the networked information society, either realizing or eliminating its potential for human flourishing. It is the opinion of the author that the existing imbalanced regime functions to the detriment of both commercial and non-commercial information production. Better solutions may come from the appropriate implementation of the A2K aims and intellectual framework within the existing model of control. They may also arise from new technological applications or from types of DRMs and TCs that manage content through the most equitable means. They may even find fruition through DRMs and TCs, which, combined with e-payment mechanisms, will give opportunities to creators to market their works directly to the public and which may well radically alter the landscape of knowledge governance.

Our fundamental knowledge system, as HG Wells once envisioned it, is indeed more spectacular than ever and constantly aspiring to a level, whence it becomes the collective brain of mankind, accessible by each and every constituent at a touch. What the world currently lacks is the legal and technological model to make this a reality.