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THE NEW PARADIGM OF CREATIVITY AND INNOVATION AND ITS COROLLARIES FOR THE LAW OF OBLIGATIONS

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§ 1. *Three Claims and One Corollary.* In our legal systems the incentive to creativity and technological innovation has been provided for over three centuries by the legal tool of exclusivity. Over that period of time, exclusivity underpinned a paradigm which dominated all the areas of creativity and innovation and shaped each and all intellectual property rights (IPRs) as enshrined in the twin Conventions of Paris (1883) and of Berne (1886) and: copyrights, patents, as well as trademarks.¹ However, in the last twenty years the question has arisen whether in an age in which a great part of novel creations and innovations comes by in digital format and network-driven digital platforms enable unprecedented forms of cooperation in the production, sharing and dissemination of innovation, the prior exclusivity-centered paradigm still is entirely appropriate or, in the alternative, should be revised, amended and complemented.²

¹ The point has been made innumerable times; on the role of exclusivity – categorized as one of the three “P”s (Property, Procurement and Patronage) which may remedy market failure in the provision of public goods – see the brilliant presentation by P. DAVID, *Intellectual Property Institutions and the Panda’s Thumb: Patents, Copyrights, and Trade Secrets in Economic Theory and History*, in M.B. Wallerstein-M.E. Mogege-R.A. Schoen eds., *Global Dimensions of Intellectual Property Rights in Science and Technology*, National Academy Press, Washington, D.C., 1993, 19 ff., expanded in a later and memorable presentation at the Alessandria University, *Le istituzioni della proprietà intellettuale e il pollice del Panda: brevetti, diritti d’autore e segreti industriali nella teoria economica e nella storia*, in (G. Clerico and S. Rizzello eds.), *Diritto ed economia della proprietà intellettuale*, Cedam, Padova, 1998, 9 ff., 24 ff., 28 ff.

² This is a point which is now very widespread and well established (see among the many Y. BENKLER, *The Penguin and the Leviathan. The Triumph of Cooperation Over Self-Interest*, Crown Business, New York, 2011; *Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production*, in 114 *Yale L.J.* 2004, 272 ff.) and has been taken up by mainstream media: see the Editorial *The new model sharing economy* in *The Financial Times* August 10th-11th, 2013. For additional references see my paper *Copyright Policies for Digital Libraries in the Context of the i2010 Strategy*, presented at the 1st Communia Conference, Louvain-la-Neuve, Belgium (1 July 2008), available at <http://www.communia-project.eu/node/110>, and my earlier article *Da Chicago al Ciberspazio*, in (G. Clerico and S. Rizzello eds.), *Diritto ed economia della proprietà intellettuale*, quoted above at note 1, 83 ff., especially at 94 ff. The idea of an approaching paradigm shift finds its origins in the seminal works by E. VOLOKH, *Cheap Speech and What it Will Do*, 104 *Yale L.J.* 1995, 1805 ff. and I. DE SOLA POOL, *Technologies of Freedom*, Cambridge and London, The Belknap Press of Harvard University Press, 1983.

In this paper I will stake three claims. *First*, that in our legal systems³ the incentive provided by exclusivity is no longer always indispensable to provide the optimal rate of creation and innovation, as the social and technological basis of creativity and innovation have in the meantime dramatically changed (§ 3). *Second*, that, while IP exclusivity may still be required to provide an incentive for technological innovation (§ 4), is apt to occasionally backfire, that is to prove counterproductive even in view of the generation of novel works and technology (§ 5). *Third*, that an entirely new paradigm of creativity and innovation is emerging. In this latter connection, I will argue that in this novel paradigm, which for the time being would appear to be called to complement rather than to replace the old exclusivity- and market-exchange-based model, a crucial role is played by digital network-driven cooperation rather than by the incentive provided by exclusivity. I will also argue that the driving role played by cooperation rather than by the incentive provided by exclusivity is to a large extent accounted for by three technological features of digital resources which have become essential components of the process of creating works and inventing technologies: digital resources are non-rival in production as well as in consumption; they are complementary; and their combination in re-use is not predictable *ex ante* (§§ 3.1-3.4).

After articulating these three claims, I will explore a few of their corollaries. After briefly touching the pillars on which the new paradigm is based and the legislative agenda which is appropriate to maximize its contribution to societal welfare (§ 6), I will turn to the implications the same paradigm may have at the level of the legal tools used to engage in the transactions which typically take place among the players engaged in the process of generating and dissemination new creations and technologies (§§ 7-8). In the past, the legal tool we usually categorize as contract or agreement has always been the centerpiece on which transactions concerning works and technology-incorporating goods rested. I suggest that in the current digital network-driven context the role played by contract is receding, while the role played by contract's lesser brother, which we usually characterize as "unilateral act", is gradually expanding. Indeed, a growing body of evidence shows how on line cooperation in creativity and innovation resorts more often to unilateral acts than to contracts, agreements or contractual arrangements; hybrid business models, where the free provision of goods and services ("gifts") is complemented by price-based market transactions, are coming center stage. This development may call for a radical rethink both of the theory and practice of unilateral acts, and particularly so in the crucial areas which are affected by the digital nature of the resources shared or exchanged. More specifically, it would appear that the time has come to ask once again whether we should still stick to the belief that unilateral acts are atypical rather than atypical (as contract are); whether they are revocable or not; and finally (§ 9) whether it makes sense at all that the rules concerning them still are municipal rather than global.

§ 2. *The Traditional Case For the Incentive Role of Exclusivity In the Old Paradigm.* The case for conceiving exclusivity as the centerpiece of the old creativity and innovation paradigm has been very strong all along.⁴ There is no doubt that new works and new

³ By this expression I mean to refer to the States which are members to the Paris and Berne convention or became parties to it by signing the WTO-TRIPs agreements.

⁴ For a classic treatment J. HIRSHLEIFER, *The Private and Social Value of Information and the Reward to Inventive Activity*, in 61 *Am. Econ. Rev.* 1971, 561 ff. and W. LANDES-R. POSNER, *An Economic Analysis of Copyright Law*, in XVIII *Journal of Legal Studies* 1989, 325 ff. For a thorough rethinking see J. LERNER, *The Patent System in a*

technology are not manna; they do not fall on us from the sky. On the contrary, as great scholars have shown over the centuries, they are public goods; which means that the market mechanism as such is not in able to provide the level of creativity and innovation optimal for society. The failure of market forces to bring about the optimal level of creative works and innovative technologies is explained by twin features which characterize both creativity and innovation. The two features are well known: public goods consisting in information and knowledge are non-rival in use, meaning that the use by an individual other than the creator does not subtract anything from the creator herself; at the same time they are non-excludable in possession, meaning that once the information is “out”, that is disclosed by the creator, she cannot prevent its duplication by third parties, including imitators and “free-loaders” who take advantage of the effort and ingenuity of innovators.

It has been magisterially shown that the market failure in the provision of public goods may be overcome by one or more of legal devices, or a combination of them: either exclusivity, in the form of a property right (Property), or Patronage, i.e. a reward given by political powers to creators and innovators, or, finally, by Procurement, that is by having governments contracting out (for a price) the provision of novel works and technologies.

A property right is a legally enforceable power to exclude others from using a resource.⁵ The legal tool of exclusivity provides the crucial – and otherwise missing – incentive to creation and innovation. The power to exclude others from duplicating and imitating the novel work or technology guarantees that the creator or innovator, by preventing the free riding or free loading by unauthorized third parties, appropriates the value added by her novel work or technology.⁶ Exclusivity thereby supplies (*ex ante*) the incentive and (*ex post*) the reward for the investment, of time, effort and money, necessary to generate them.⁷

§ 3. *Why In the Digital Environment the Incentive Provided By Exclusivity Is Not Always Required.* Against this background, it is entirely reasonable to ask why the incentive provided by exclusivity should no longer prove as necessary in the digital environment as it for a long time was in the analogue world. Indeed, I still vividly remember an exchange of views precisely on this issue between Tony Kronman and Larry Lessig in a conference

Time of Turmoil, in *The WIPO Journal*, 2010, 28 ff. It should be noted that the argument developed in the text does not apply to trademarks, as these are not public goods: see W.M. LANDES-R. POSNER, *Trademark Law: an Economic Perspective*, in *XXX Journal of Law and Economics*, 1987, 265 ff., at 274 (“a proper trademark is not a public good; it has social value only when used to designate a single brand”).

⁵ W.M. LANDES-R. POSNER, *Trademark Law: an Economic Perspective*, quoted above at note [9], 266.

⁶ On the link between the general theory of property rights as tools to foster optimal allocation of resources and the rationale for granting exclusivity to IP see for further detail § 5.1.2.

⁷ Of course, the benefits provided by exclusivity are not limited to the incentive-reward function referred to in the text. For an account of the other functions of intellectual property protection, and namely the dissemination, disclosure and public domain functions, see K. ARROW, *Economic Welfare and the Allocation of Resources for Invention*, in *The Rate and Direction of Inventive Activity: Economic and Social Factors*, National Bureau Committee for Economic Research, Princeton University Press, Princeton, N.J., 1962, 609 ff. and R. MAZZOLENI-R.R. NELSON, *Economic Theories about the Benefits and Costs of Patents*, in *XXXI Journal of Economic Issues*, 1998, 1031 ff. For a treatment of the specificity of the cost and benefits of copyright protection *vis-a-vis* patent protection see N. W. NETANEL, *Copyright and a Democratic Civil Society*, in 106 *Yale L. J.*, 1996, 283 ff. and P. DAVID, *Le istituzioni della proprietà intellettuale e il pollice del Panda: brevetti, diritti d'autore e segreti industriali nella teoria economica e nella storia*, in (G. Clerico and S. Rizzello eds.), *Diritto ed economia della proprietà intellettuale*, quoted above at note 1, 9 ff.

in Torino back in 1999. Prof. Kronman made the case that the flurry of innovation and creativity which had been prevailing in the first decade of the internet could only be explained in terms of a one-off spurt of imagination and fantasy triggered by the novel infrastructure. However, as kids get tired of new toys after a while, and neglect them leaving in a corner after the first rush of enthusiasm has abated, he argued, also creativity and innovation over the net will taper off, unless the “immutable” laws of economics set in once again and the incentive provided by exclusivity is thus set in motion. I do not remember that Prof. Lessig’s reply was particularly convincing.⁸ Indeed the reply to the incentive-in-the digital environment question is not an easy one and time would be required before the outline of a possible explanation could emerge. Maybe the time has come when we may start to glean the components which go in to the reply. Let me therefore try to cobble them together.

3.1. *The Change In the Social and Technological Basis of Creation.* Let us start from the copyright side of the issue, by looking first at the question of the continuing necessity of incentives in a digital environment from the perspective of the creation of those entities which are apt to be protected by copyright, that is – in common IP parlance – “works”.⁹ In this connection, one development has become increasingly clear: in our post-post-industrial age, the long route which used to lead the work from its creator to the public by passing through business (and sometimes different categories of businesses) is gradually being replaced by a short route, which puts in direct contact creators and the public. This development, which ultimately is bringing about the merging of producers and consumers of works (and making them “pro-sumers”), should be briefly sketched.¹⁰

3.1.1. FROM THE LONG ROUTE... In the analogue world, direct access to the market by creators was confined to a limited number of very special cases.¹¹ Otherwise, it could be taken for granted that the intermediation of business was necessary to bring works from creators to markets. In particular, impresarios were required to organize performances; books and records needed to be printed. For this latter purpose some kind of “factory” was required, to manufacture what in effect were fixed, stable, material or – as the expression now goes – “hard” copies of the work. In turn these hard copies needed to be stored, transported, distributed, before reaching the shelves where the public would finally find them.

It was difficult for creators to engage in all these steps; and this is why, as a rule, they preferred to resort to businesses to set up the characteristic trilateral relationship

⁸ Actually, on that very occasion Prof. Lessig made an important case, arguing that the power of monopoly and control previously held by upstream businesses was being eroded by the architecture of the internet, which is designed to allow for freedom to innovate in the end-layers of the infrastructure; and that this newly acquired freedom accounted – and would in the future account – for the extraordinary rate of creativity and innovation witnessed on the web. However, this explanation (which was later developed in M. A. LEMLEY – L. LESSIG, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, in 48 *UCLA Law Review*, 2001, 925 ff., at 930 ff. and 938 f.) contains only a half truth: removing an obstacle is not the same as providing an incentive.

⁹ As we will see (below at note [9] and accompanying text) a not very different reasoning may extend to the close relations of copyright which we European conceptualized as neighboring or related rights, including data base *sui generis* right)

¹⁰ For additional references see my *Individual and collective management of copyright in a digital environment*, in P. Torremans (ed.), *Copyright Law. A Handbook of Contemporary Research*, Edward Elgar, 2008, 282 ff. at 285 ff. and 308 ff.

¹¹ Such as the painter personally seeking out patrons to sell his paintings or the wandering gipsy carrying around his violin.

between creator, business and the public, which is typical of primary exploitation of copyrighted works.¹² The kind of business which appeared indispensable for this purpose had features which the last few centuries made familiar. To begin with, it had to make substantial outlays to figure out whether there was a market for the work; then again it had to invest and take large risks for the setting up of the performance or the mass production of material copies of works and for their distribution; and this on a scale which increased in step with the extension of the markets. Publishers, Hollywood and the record labels are appropriate cases in point. Radio and TV came in to take care of so called “secondary” utilization of work.

In all these regards, it certainly can be said that this was a quite long route to institute a contact between the creator and the public; and that business was a very valuable, indeed indispensable intermediary to achieve such a goal. In this context, exclusivity played a crucial role. Businesses would never have undertaken the risk of the investment required of them if they were not allowed to engage in price-based market transactions to recoup it; exclusivity – that is the legal rule prohibiting rival performances or the sale of unauthorized copies of books or records – was the indispensable tool to provide the corresponding incentive. As a rule, also “creators” were professionals: professional playwrights, novelists, music composers and so on. Royalties and remuneration provided the wherewithal for their living; but none of these would come out of businesses pockets if exclusivity, and the price-based market transactions it enabled, were not available.¹³

3.1.2. ... TO THE SHORT ROUTE. In the digital environment all this dramatically changes. On the production side, perfect digital copies make “factories” of physical, material copies of works redundant, at least in principle.¹⁴ What is specially remarkable is that this same development is now reaching the movie industry. Until recently this sector of the entertainment business appeared to be the last bulwark in which capital intensive business could be considered really indispensable. But this is becoming less and less true as each day passes. Jean Cocteau predicted that the tools required for the creation of a movie would at some point in time become as cheap as paper and pencil; and digital technology may still prove his vision right.¹⁵

On the distribution side a similar – possibly less visible, but certainly even more striking – process has been taking place for some time now. This is so because digital goods which are distributed through the net are light rather than heavy, and use up a limited amount of storage space. But even more so because the technological endowment held by the public at the receiving end has in the meantime been transformed. Even in the

¹² See in this connection W.R. CORNISH, *Intellectual Property: Patents, Copyright, Trade Marks and Allied Rights*, London, Sweet & Maxwell, 1996, 401.

¹³ For a brilliant account of the – peculiar, but not surprising – legal invention whereby exclusivity was vested in the creators rather in businesses see W.R. CORNISH, *Authors in Law*, in *Modern Law Review*, 1995, 1 ff.

¹⁴ It may be argued that this is true only for additional copies, the ones which can be costlessly multiplied after what we could call the initial embodiment, the prototype or the “master” has been first created; and to this it may be added that for the latter the required investment still is huge. This objection has indeed been raised a number of times [e.g. by P. AUTERI, *Diritti d'autore, nuove tecnologie e Digital Rights Management*, in (M.L. Montagnani, M. Borghi eds.) *Proprietà digitale: diritti d'autore, nuove tecnologie e Digital Rights Management*, Egea, Milano, 2006, 23 ff.]; but the case becomes less and less defensible as the time passes. The role of software and of digital technology in the creation and initial fixation of music is increasing all the time; and their cost is decreasing in parallel.

¹⁵ For starters see on Open Source Cinema http://en.wikipedia.org/wiki/Open_Source_Cinema.

past the end user had to make an investment of sorts in technology, by purchasing a radio or a TV set, a record player or a tape recorder. The novel feature is that since the beginning of the digital age the scale of a minimum unit of the technological endowment at the receiving end – e.g. the memory of a PC – has started to be largely in excess of the average needs of the consumer;¹⁶ and as a rule each unit is interoperable with all the others. A similar analysis can be reiterated in connection with file-sharing. Whatever legal assessment we may pass of this practice, its ultimate technological ramifications cannot be revoked in doubt.¹⁷ Here we have enormous excess capacity residing with the public at large at the receiving end; and this excess capacity can be mobilized to create distributive networks of extraordinary scale, scope and effectiveness.

In this novel context, it would seem that the setting up of a relationship between creator and business no longer has the same compelling rationale it used to have in the past. Digital copies are (nearly) perfect; and can be duplicated at no cost at the receiving end. Therefore, in an increasingly large number of situations both the “factory” and the physical distribution chain are no longer indispensable.¹⁸ It appears therefore that creators can more and more often access markets without engaging in the trilateral relationship which used to be characteristic of dealings in copyright. Indeed, these technological determinants enable creators to make works directly available to the public. It is even more remarkable that an increasingly large number of members of the public itself are in turn grabbing the opportunity offered by the technology available at the receiving end and transform themselves into producers and distributors of works.

To make a long story short: both the production and distribution functions migrate from business to the public and there they can rely on excess resources available at each consumption unit. These, if individually of small scale, may be multiplied by very large numbers to provide almost infinite manufacturing and distribution capacity in a way that dwarfs past industry investments and makes them to a large extent redundant.¹⁹

The stage scenario has indeed changed. Social sharing enters; business recedes. As a result, the long route from creators to the public is becoming much shorter; and this is happening more and more all the time. Today creators set up their own sites and make text and music directly accessible to the public therefrom.²⁰ Currently, user generated content and social networks are growing exponentially:²¹ creators and public are finally merging into each other. To make a long story short: the British Encyclopedia is in the past; Wikipedia is an extraordinary success; and yes, Encarta, the digital encyclopedia

¹⁶ As noted by Y. BENKLER, *Sharing Nicely*, above at note 2, 277.

¹⁷ As indeed aptly described by the decision of the US Supreme Court of 27 June 2005, *Metro-Goldwin-Mayer Studios Inc. et al. v. Grockster, Ltd. et al.*, 125 S. Ct. 2764 (2005).

¹⁸ Both developments were predicted a number of years ago: see E. VOLOKH, *Cheap Speech and What it Will Do*, quoted above at note 2, and I. DE SOLA POOL, *Technologies of Freedom*, quoted above at note 2, 249-251.

¹⁹ It may be questioned whether cloud computing (on which see D. LAMETTI, *The Cloud. Boundless Digital Potential or Enclosure 3.0*, in 17 *Virginia Journal of Law and Technology*, 2012, 190 ss.) reinforces or calls in question the direction of this process: software-as-a-service, infrastructure-as-a-service and platform-as-a-service slim down the amount of technology which both businesses and the public require in order to generate and access content; and possibly announce the emergence of a new generation of powerful intermediaries.

²⁰ On the early beginnings of the phenomenon, when Stephen King set up a site to allow readers to download his latest short story, ‘Riding the bullet’, at \$ 2.50 per download, see J. EPSTEIN, *The Rattle of Pebbles*, in *The New York Review of Books*, 27 April 2000, 55 ff., at 57-58. However, to a large extent the diffusion of e-books entails a re-intermediation of the field.

²¹ For an early appraisal see K. VARNELIS, *Networked Publics*, MIT Press, Cambridge, 2008.

created by Microsoft which was based on the old, proprietary, market-based approach was a true flop.

3.2. Exclusivity and Openness in the Dissemination of Digital and Intangible Copies. As long as works were brought to the market along the long route, it was essential for creators and even more so for businesses to control and restrict access to works, as the monopoly granted by expansive exclusive rights enabled them both to keep out free-riders and imitators and accordingly to charge whatever price the market would bear. Thus the exclusivity granted by copyright uses the leverage given by IP protection to maximize returns by controlling and restricting the ways in which the work is from time to time exploited by means of price-based market transactions.

This long established *modus operandi* is frontally challenged when the exploitation of works no longer takes place in the bricks-and-mortar world of music theatres, books, records, radio, movies and television and is based on digital and intangible copies rather than of entities which are tangible or located in a bricks-and-mortar context.

A few remarks may be in place here to approximate the implications of the transition from analogue to digital, from bricks-and-mortar to virtual. The *first* one concerns the place of intangible digital copies in IPR theory. In IPR theory, while the object of the IPR, be it a logo, an invention or novel, is an *ideal entity*, the – potentially infinite – *copies* which might embody it, be they Coca Cola bottles, brakes or books, have a discrete, physical, material, tangible (“hard”) existence, locating them in the bricks-and-mortar world. This duality of IP is described in the tradition of classical IP law by contrasting the ideal (*corpus mysticum*) and the real entity (*corpus mechanicum*). In this connection, we should keep in mind that also digital copies are *corpora mechanica*, in that they are material, physical copies, even though *intangible* ones: while we may not touch them in the same way as we touch a book or a record, nevertheless they consist of electric or magnetic currents, forming a predetermined sequence of bits, which has a separate, discrete existence from other sequences of bits.²² *Second*, also digital copies, intangible as they may be, can be incorporated into stable, material embodiments, be they the plastic medium of CDs or DVDs or the discrete location assigned to them in a server or in another device.

Third, and more importantly for present purposes, they differ from tangible copies in that they may be multiplied in infinite numbers of perfect copies at a cost which approximates zero. This feature marks an important discontinuity with the past: while additional Coca Cola bottles, brakes and books do require using up of a certain amount of physical resources to be manufactured, this is not the case with digital copies, which can be duplicated at no cost by whomever happens to lay her hands on the corresponding electronic file.

The same feature accounts for the reason why digital copies have been disseminated from their creators to the public in two radically different modes. This bifurcation deserves close exploration, as it highlights very different attitudes towards exclusivity.

The first mode came to the fore in the sixth decade of last century in the form of proprietary software licensing²³ and has been followed by agreements providing, *inter alia*, for the making available in digital form of works and content (digital publishing) or of

²² See R. ROMANO, *L'opera e l'esemplare nel diritto della proprietà intellettuale*, Cedam, Padova, 2001, 152 and note 35 at 224 f.

²³ See I.V. HEFFAN, *Copyleft: Licensing Collaborative Works in the Digital Age*, in 49 *Stanford Law Rev.*, 1997, 1487 ff.

data sets (data base agreements).²⁴ Also proprietary licensing is based on exclusivity, exactly as the dealings with IP-incorporating goods and physical copies, except that here exclusivity comes with a vengeance: as digital goods are prone to escape licensor's control ("information wants to be free"), an extra effort is made to restrict by means of contract, law and technology the chance that end-users of the digital copy duplicate it and re-distribute it, thus becoming competitors of licensor. In this first variety of digital licensing ("proprietary", "market based" and "closed"), the goal has been to enlist all possible tools to ensure the strictest control over digital copies not authorized by licensor and thus to assure the continued feasibility of price-based market transactions. This goal has been pursued both by contractual and technological means, that is, by having licensee contract away whatever limitations and exception she/he may have²⁵ and by resorting to technological measures (which may be described as DRM or TPM depending on the circumstances) to prevent unauthorized duplication and by invoking legislation banning circumvention of technological measures.²⁶

There is also a second variety of digital licensing, however. Its story is particularly relevant in the present context, so it deserves some mention, even though it has been told and re-told many times. It starts in the late Sixties with the emergence of open source software and extends to works other than software by means of copyleft and "free" licenses such as Creative Commons.²⁷

In this second variety of digital licensing, the approach towards exclusivity has been exactly opposite to the strategy pursued by proprietary, market based licensing. To begin with, here licensor typically gives up one or more of the exclusive rights she is legally entitled to ("some rights reserved", as opposed to "all rights reserved"). Here IP exclusivity is used as a tool to open rather than to restrict. Licensees are authorized to use the licensed subject matter, provided that they abide by the rules contained in the license; in turn, these rules are intended to keep re-use free. The terms of the license intend to make the digital resource "open"; and, according to a widely followed definition, "a piece of data or content is open if anyone is free to use, re-use and redistribute it".²⁸

²⁴ See D. FOOSBROOK-A.C. LAING, *The Media Contracts Handbook*, 2nd ed., Sweet & Maxwell, 2001 and I. WINTERNITZ, *Electronic Publishing Agreements*, Oxford University Press, Oxford, 2000.

²⁵ For an analysis of contractual clauses purporting to abridge limitations and exceptions see my *IP Limitations and Exceptions and Competition: a Normative Assessment*, in *AIDA* 2013, at [9] where additional references.

²⁶ For early accounts of Digital Rights Management (DRM) and Technical Protection Measures (TPMs) see Th. VINJE, *Copyright Imperiled*, in *EIPR*, 1999, 192 ff. at 197; J. COHEN, *WIPO Copyright Treaty Implementation in the U.S.: Will Fair Use Survive?* *EIPR*, 1999, 236 ff.; L. LESSIG, *Code and Other Laws of Cyberspace*, Basic Books, New York, 1999, 213 ff.; C. CLARK, *The Answer to the Machine is the Machine*, in B. Hugenholtz (ed.), *The Future of Copyright in A Digital Environment*, Kluwer Law International, The Hague, 1996, 139 ff. and K.W. DAM, *Self-Help in the Digital Jungle*, in *The Journal of Legal Studies*, 1999, 393 ff.

²⁷ On open source software see Y. BENKLER, *Coase's Penguin, or, Linux and The Nature of the Firm*, in 112 *Yale L.J.*, 2002, 369 ff., at 374 ff.; for a treatment of FOSS licenses in the perspective of Italian law see V. ZENOVICH-P. SAMMARCO, *Sistema e archetipi delle licenze open source*, in *AIDA* 2004, 234 ff. On Creative Commons B.F. Fitzgerald-J.M. Coates-S.M. Lewis (eds.), *Open Content Licensing: Cultivating the Creative Commons*, Sydney University Press, 2007 and N. ELKIN-KOREN, *What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons*, in 74 *Fordham L. Rev.* 2005, 375 ff.

²⁸ "subject only," the definition goes on to state, "at most, to the requirement to attribute and or share-alike": see <http://opendefinition.org/>. On the "viral" feature of share-alike licenses and the so called "copyleft clause", which requires the licensee to make all his additions available under the same open access conditions to all subsequent users, see also for further references my *Public Sector Information as Open Data. Access, Re-Use and the Third Innovation Paradigm*, in (M. Ricolfi and C. Sappa eds.), *Extracting Value from Public*

This approach in favor of openness differentiates the second variety of digital licensing both from the traditional exploitation modes of works in the brick-and-mortar context and from the first, proprietary, variety of digital licensing, which have in common the feature of building on an unmitigated reliance on exclusivity to enable price-based market transactions. What accounts for this quite strikingly novel adopted by the second variety of digital licensing, as shown by the specific features of FOSS, CC and the other alternative licenses? To sketch out a tentative reply we will have a look in turn at the technological and social determinants of the phenomenon.

3.3. Non-Rivalry in Production and Complementarity in Re-use of Digital Resources; Ex-Ante Unpredictability of Their Combination. The second variety of digital licensing builds on the perception of two specific technological features of digital copies, that is their non-rivalry both in consumption and production on the one side and complementarity on the other. Not only digital copies are perfect, costless and infinite; the fact that one person uses a digital copy does not subtract anything from the consumption of the next user; they are, in other words, non-rival in consumption. Moreover, when we take into account that digital copies, being amenable to being multiplied into infinite, costless, and perfect copies, may be also used as inputs for the production of any number of downstream goods and services, we come across a feature which is unheard of in the bricks-and-mortar world: digital copies are non-rival also in production.²⁹ While in the bricks-and-mortar world the metal used for building this specific Coca Cola can is taken away from its possible alternative use in manufacturing that brake, the same Google Map may be used both for building on it an application dedicated to bikers wishing to avoid showers and specialist oil rig repair engineers;³⁰ an application indicating the location hamburger joints and an emergency-application used to help out people trapped in a devastating fire.³¹ In other words, one of the most remarkable features of digital assets is that they are amenable to joint production, that is if technical protection measures and law do not stand in the way. Additionally, digital assets show a strong complementary character in re-use. They may be combined, mixed or “matched” to create a new product or service; and in turn these first generation products or services may be used as intermediate inputs for additional derivative products and services downstream.

As a matter of fact, non-rivalry and complementarity are features which apply to all digital assets. However, this common feature is dealt with in two very different ways by the two varieties of digital licensing we referred to earlier. While the purpose of the first kind of digital licensing is to defuse, by legal and technological means, the potential implicit in non-rivalry in production and complementarity in re-use of digital assets, by

Sector Information: Legal Framework and Regional Policies, ESI, Napoli, 2013, 3ff. at [9]. Much has been written about this ‘viral’ feature in software licenses, whereby the original condition imposed by the first licensor to the first licensees is propagated by the latter downstream, exactly as a virus would do, to cover each and all pieces of software building on the basis of the initial chunks of programming.

²⁹ The link between the possibility of creating infinite, costless and perfect copies on the one side and non-rivalry in production and complementarity in re-use is illustrated in its general terms in connection with digital assets by J. HOFMOKL, *The Internet commons: towards an eclectic theoretical Framework*, in 4 *International Journal of the Commons*, 2010, 226 ff., at 243 ff.

³⁰ For an illustration see Deloitte, Tech4i2, and Others, *European Commission, Information Society and Media Directorate-General, POPSIS, Pricing of Public Information Sector Study’ Summary Report*, available at http://ec.europa.eu/information_society/policy/psi/docs/pdfs/opendata2012/reports/Deloitte/summary.pdf, 16.

³¹ As it happened in Queensland during the horribly hot 2011 summer.

restricting and disabling non authorized re-use, the second kind of digital licensing (in its different shades of being “non-proprietary”, “non-market” and “open”) strives to harness the same potential for its own purposes. Non-rivalry in production and complementarity of digital assets are the basis on which the strategy of fostering and encouraging dissemination, particularly over digital networks, is built.

It should also be noted that the way in which digital resources may be combined to create novel goods or services is *ex ante* unpredictable. Even in this connection, the second variety of digital licensing takes an approach which is exactly opposite to the one adopted by all forms of price-based market transactions. Indeed market transaction concerning IP-incorporating goods strive to avoid *ex ante unpredictability*, by reaching the completeness of contract terms which may be required to make sure that profit maximization is obtained.

The reason why the second variety of digital licensing builds on *ex ante unpredictability* is not difficult to understand: the mixing and re-mixing of digital assets, the matching of digital data sets, unanticipated combinations are encouraged, as they lead to a more widespread re-use of the digital resource. The digital challenge is here seen not as a threat but as an opportunity. To understand why this is so, we should turn to the social basis of on line creativity.

3.4. *The Grammar Of Interests In the Second Variety of Digital Licensing.* What are then the goals of creators operating along the short route? For sure we know that they are not so clear cut as the ones which prevailed (and prevail) along the long route and which can be encapsulated by reference to the formula of profit maximization *via* price-based market transactions.

However, the evidence available may give us some clue. The great majority of the creators operating along the short route, be it 9 out of 10 or 95 out of 100, do not make a living out of “sales” of “copies” of their works; they earn their livelihood in another activity or business and devote a portion – often a very large portion – of their spare time to “creating”. Their contributions (actually: our contributions) may be very different: photos, music, audiovisual materials, blog posts, other text, all made available digitally over the net. What we are witnessing to here is not to emergence of a new group or class or society section of creators; we are witnessing to a re-modulation of the ways of life of over a billion people from every walk of life who devote part of their time and energy and resourcefulness in making contributions available over the net.

From the economist’s perspective, these contributions may fall into two categories: either they are gifts or, in the alternative, components of a wider set of transactions (an “hybrid”) which has an element of gift and an additional, for profit element, more or less loosely linked to it.

Let us look at them separately.

The gift component is best exemplified by looking at Wikipedia. Contributions to Wikipedia items are totally free, that is, the contributor does not receive any kind of remuneration, either monetary or otherwise. Also the credit received is so minor not to be relevant to the transaction. There is an element of reciprocity, however.³² Contributors are willing to contribute their small grains of information or knowledge, on the understanding that others will do the same with the different grains of information and knowledge these others may possess. Fragments are contributed to the larger canvas on the assumption that

³² Y. BENKLER, *The Penguin and the Leviathan*, quoted above at note 2, 29 ff.

the canvas will be eventually completed by other fragments; and that the canvas itself will be complemented by other canvases.

Hybrid transactions have been studied even more closely.³³ Indeed, their blueprint was provided quite a long time ago by that forerunner of the second variety of licensing which is FOSS; and its scope is constantly being enriched and enlarged by the ingenuity of internet- and digitally savvy individuals and communities. Usually, also these digital contributions, from free music over the net to Flickr images and photographs, are given away for free, i.e. they do not generate extra income for the person who is contributing them. However, they tend to have positive spill-over effects on the main line of business of their contributors, as they may give them recognition, professional credit or a combination of the two. Even when the creators operating along the short route are professionally engaged in the creation of works, which is normally not the case, their business model usually is based on income flows different from the sale of digital copies as such. To exemplify and to give a flavor of what is going on, let me mention that there is a shift whereby even singers and songwriters increasingly rely on performances, tours, endorsements, merchandising and their likes³⁴ rather than sales of albums and tracks.

This is the business model which the Grateful Dead pioneered, possibly taking a clue from open source software and IBM, and which is currently expanding to an increasing number of businesses. So that the eminent economist Paul Krugmann a few years ago made the case that the demise of reliance on income based on “hard” copies was being generalized and, making his case, quipped that in the long run we will all be the Grateful Dead.³⁵ What is important for creators engaged along the short route is, it would appear, that their work can be disseminated as widely as possible, on the condition that the work is correctly attributed to them.

While at first blush it might appear that this second approach is revolutionary, it turns out that even from a strictly economic viewpoint it makes a lot of good sense, on a number of grounds. Indeed, it has been convincingly shown that economic decisions are made and resources are allocated not only on the basis of market-based exchanges and firm-based hierarchies, but also on the basis of sharing or peer production.³⁶ The case has also persuasively made that this latter mode of production is likely to gain traction in network-driven digital environments, where it takes the form of distributed cooperation.³⁷ Indeed, at a time in which the cost of technological resources has dramatically decreased, it has turned out that distributed modes of production may at times have distinctive *competitive advantages* over markets and hierarchies in dealing with information; and that

³³ In this connection see L. LESSIG, *Remix. Making Art and Commerce Thrive in the Hybrid Economy*, The Penguin Press, 2008, especially at 177 ff.

³⁴ Including revenue from product placement embedded in virally disseminated videoclips (as magisterially shown by Lady Gaga).

³⁵ P. KRUGMAN, *Bits, Band and Books*, New York Times 6 June 2008. This trend seems confirmed by the current behaviour of “traditional” businesses, which are indeed seeking to obtain a share of these novel income streams: see J. GAPPER, *The music labels can take a punch*, Financial Times 3 July 2008, noting that labels have started “to get a slice of the action from the artists’ other earnings, including live performances and merchandising”. Accordingly, “Universal is taking a share of touring and merchandise revenue in 90 per cent of contracts it signs with new artists”.

³⁶ See Y. BENKLER, *Sharing Nicely*, quoted above at note 2, 277 ff. and *Coase’s Penguin, or, Linux and The Nature of the Firm*, quoted above at note [9], 369 ff., where additional references.

³⁷ See Y. BENKLER, *The Wealth of Networks. How Social Production Transforms Markets and Freedom*, Yale University Press, 2006 also available at <http://www.benkler.org/wonchapters.html>.

the net enables forms of cooperation based on modularity of tasks, communication and community building which in several instances have consistently outperformed even the very best businesses.³⁸

It should also be noted that the second variety of digital licensing is apt to give an important contribution in terms of social and public value, besides the market value they may generate. This is the obvious aftermath of an approach whereby digital resources may be incorporated for free and without strings attached in the building of downstream products and services which often entail the creation and dissemination of public goods.³⁹ Therefore their value may be measured not only in terms of dollar benefits to the parties to the transaction, but also of positive externalities, that is value to third parties which are not privy to the license. In classic IP licensing, as well as in digital licensing of the first variety, this feature is at best incidental.

The quantitative and qualitative importance of sharing may be visualized considering a simple matrix concerning economic choices. This matrix may be designed as follows:⁴⁰

CHOICES	Market	Non market
decentralized	price	X
centralized	firm	regulation

It has been noted⁴¹ that usually we concentrate on the three boxes which have labels (price, firm,⁴² and regulation). As a rule, it does not occur to us that choices may also take place in accordance with the way indicated in the box indicated with the letter X, that is in a way which is at the same time decentralized and non-market.

³⁸ See Y. BENKLER, *The Penguin and the Leviathan*, quoted above at note 2, 169 ff.

³⁹ Thus the Italian service “Voglio il ruolo” (“I want tenure”) gives subscribers access to openings for high school teaching positions, in view of enabling candidates to select the schools to which apply for a permanent position as a teacher (see A. LONGO, *Fare affari con gli open data*, in *Il Sole 24 Ore*, 22 April 2012, 47). The data set is the basis for a number of ancillary services, the majority of which is for free; a 10 € subscription per year is complemented by advertising revenue. The data set and the services built around it and by “matches” with other data sets would appear to reduce the opaqueness of school labor markets and to enable more targeted teachers’ mobility in the school sector. It may therefore be assumed that the output created by matching the various data sets is liable to create welfare benefits in the form of externalities benefiting also third parties, including pupils. These benefits are likely to go well beyond the willingness to pay by interested teachers as measured by the sum of the price of subscription and advertising revenue (which netted a total of € 80 thousand in 2011) and are sure to exceed whatever willingness to pay the third party beneficiaries (schoolchildren and parents) may hypothetically have. The relevance of non market value, including public and social value, for assessing contribution to welfare is often considered by generalist and PSI specific literature: see respectively B.M. FRISCHMANN, *An Economic Theory of Infrastructure and Commons Management*, in *Minn. L.R.* 2005, 917 ff., 982 ff. and D. NEWBERY-L. BENTLY-R. POLLOCK, *Models of Public Sector information provision via Trading Funds*, Study commissioned jointly by the Department for Business, Enterprise and Regulatory Reform (BERR) and HM Treasury, 2007, 25 ff. and 45 ff.

⁴⁰ This matrix is taken from Y. BENKLER, *Sharing Nicely*, above at note 2, 276.

⁴¹ By Y. BENKLER, *Sharing Nicely*, above at note 2, 276.

⁴² For all purposes, the term “firm” used henceforth should be considered an equivalent to the expression “business”; except that in this part we prefer to resort to the former, rather than to the latter which we employed sofar, because here we are discussing contributions which use the former expression and this same expression is more appropriate in the context of formal economic analysis.

There is an interesting thing in this little chart.

The production and distribution of works in accordance with the so called short route would appear to be taking place in ways which are at the same time decentralized and non-market and thus conform to the box designated as X. Decentralized and non-market choices are based on mechanisms based on reciprocity and cooperation, rather than on price-based market exchanges. This is why that short route, with which we have been dealing so many times by now, is taking off. It is neither a quirk nor a fad; it is here to stay.

3.5. THE ROLE OF EXCLUSIVITY IN THE SECOND VARIETY OF DIGITAL LICENSING.

Against this background, we may revert to our initial question, whether the incentive provided by exclusivity really necessary in the digital environment. We are now in a position to see why the reply to this question is in the negative. While the incentive provided by exclusivity may indeed be required to foster innovation and creativity and to enable its exploitation by means of price-based market transactions, as was the case when the contact between creators and their public was instituted by means of the traditional “long route”,⁴³ it has been convincingly shown that when innovation and creativity are based on digital network-driven cooperation among a large number of contributors, and participants may be contributing “small grains” of their time and attention, as it typically happens in peer production and sharing, then the question of incentives itself become trivial.⁴⁴ The motivation here does not come in the form of a financial reward, but rather in the non-monetary rewards offered by the reciprocity of the contribution given with the ones received and – more importantly – expected. On the other hand, financial reward may loom large in the background of other on line transactions; but even then it is usually derived from “hybrid” business models relying on income deriving from non-duplicable services supplied as a by-product of the free digital copies of one’s own creations, rather than on price-based market transactions over digital copies.

This means, reverting to our original question, that in the network-driven digital environment exclusivity does not play a role as an incentive. Exclusivity, however, plays here a different role: in this context it is used as a tool to open rather than to restrict. Digital files contributed over the net are made available on condition that the license terms they carry with them are respected.⁴⁵ Open source software cannot be distributed without source code; the further distribution of a CC by licensed song cannot be restricted by licensee; Wikipedia material can be incorporated in downstream creations, only if these carry with them the same “viral” share-alike clause. IP protection – and specifically copyright protection – and the exclusivity it carries with it are the legal basis for the enforceability of the license: had the contributor no IP protection, non-compliance with the terms and conditions of the license would not have adverse effects on non-complying third parties. Conversely, exclusivity entails that the non-complying third party is an infringer.⁴⁶

⁴³ See above § 3.1.1.

⁴⁴ Y. BENKLER, *Coase’s Penguin, or, Linux and The Nature of the Firm*, quoted above at note [9], 376. [expand: we all know this at an intuitive level: Cinesinho + Trattato. Interestingly enough, we do not appear to be prepared to draw the conclusions of this].

⁴⁵ On the technological mechanisms (based on metadata) which ensure the applicability of license agreements see for details below notes [9] and accompanying text.

⁴⁶ See Landgericht München 19 May 2004 (decree), *H. Welte v S. Deutschland* (2004) *CRi*, 156 ff. and for additional references below notes [9].

As noted earlier, in copyleft licenses, licensees are authorized to use the licensed subject matter, provided that they abide by the rules contained in the license; in turn, these rules are intended to keep downstream re-use free. Exclusivity is harnessed to maximize the potential implied in non-rivalry and complementarity of digital goods and their dissemination over the networks.

4. *Is the Incentive Provided By Exclusivity Still Required For Technological Innovation?* In the previous paragraphs we dealt with the question of the continued necessity of the incentive provided by exclusivity in connection with creativity. Our conclusion was in the negative. What we had in mind were works, music, text, photographs, audiovisual works and the like; a similar reasoning would seem to apply also to entities which in our current IPR system are protected by copyright-like entitlements, such as performers' rights and data-base *sui generis* right.

How about technological innovation? Intuitively, the erosion of the role of exclusivity as an incentive should not be at work here; or, at least, not to the same extent as in copyright-protected creativity. Let me try to spell out this intuition. The reason why the incentive provided by exclusivity is, as a rule, no longer necessary in connection with copyrightable (or quasi-copyrightable) creations is, according to the previous analysis, that these may be the result either of the contribution of "small grains" of individual creativity which go to form larger units by means of digital-network driven cooperation or of the free provision of creations which make up a component of "hybrid" business models.

Now, the case can be made that the field of technological innovation still remains (and will in the foreseeable future) firmly rooted in the bricks-and-mortar, non-digital world. Cars, wind turbines, airplanes, ice-creams and detergents still are manufactured by using up physical resources, even though a digital component is likely to be present either in the product, or in its process of manufacture or both, so that technological innovation tends to lead to goods which are commercialized in price-based market transactions. Therefore technological innovations is bound to remain to a large extent the preserve of formally organized businesses and of research centers, rather than of individuals and communities. This does not mean that on line cooperation in research is by definition impossible; to the contrary, we seem to be witnessing to the flourishing of a large number of initiatives which in fact would appear to harness the economies of scope and the scalability of network-driven cooperation to engage in large-scale endeavors which would otherwise be outside the reach even of powerful, public and private, research organizations.⁴⁷

However, digital-network driven cooperation in technological research would at the moment appear to be an exception rather than the rule, reserved for specific areas where the dimension of the problem in search for solution by far exceeds the size of

⁴⁷ For examples of this trend see the proposed "contractually reconstructed commons" model approach originally advocated by J. H. REICHMAN & P. UHLIR, *A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment*, in 66 *Law & Contemp. Probs.* 2003, 315 ff., later refined and adapted to specific contexts by A.K. RAI-J.H. REICHMAN-P.F. UHLIR-C. CROSSMAN, *Pathways Across the Valley of Death: Novel Intellectual Property Strategies for Accelerated Drug Discovery*, in VIII *Yale Journal of Health Policy, Law, and Ethics*, 2008, 1 ff. (in connection with drug discovery). On the "open source biotechnology" proposal see J. HOPE, *Biobazaar. The Open Source Revolution and Biotechnology*, Harvard University Press, 2008 and B. DEMIL & X. LECOQ, *Neither market nor hierarchy nor network: the emergence of bazaar governance*, in 27 *Organization studies* 2006, 1447-1466.

conventional players; and, more importantly, because even where it takes hold, it still relies quite firmly on the incentive provided by exclusivity.⁴⁸ And logically so: at the end of the day, while private individuals may be prone to adopt, in a context which favors reciprocity, the logic of gift, usually this is not a feasible option for entities which have sunk and current costs to cover.⁴⁹

Even so, there are signs that would appear to show that in the technological field, the incentive function of exclusivity has been, if not eroded, rounded off at the edges. I submit that this evolution may be detected in a number of areas, two of which deserve a special mention: a shift towards liability rules and increased resort to private ordering.

Let us look at each of these two development.

4.1. *More Extensive Resort To a Method Of Protection of Technological IP Based On Liability (Rather Than Property) Rules.* In principle, the method of protection available for IPRs is based on a property rule, rather than a liability rule.⁵⁰ In case of violation, the owner of the IP rights is entitled to have the infringement stop (by way of injunctive relief), rather than being just compensated for the resulting loss. This is not an absolute rule, though; and the number of occasions on which liability rules are favored over full property rules is increasing. Compulsory licensing regimes, which transform the property rule-based claim of the IP into a claim to compensation, is provided for, albeit under exceptional circumstances, by Art. 31 TRIPs. In some legal systems, compulsory licensing may be the remedy to antitrust violations.⁵¹ While these inroads into the property-rule based method of protection may appear occasional and *ad hoc*, one gets the feeling that a

⁴⁸ Even the “contractually reconstructed commons” paradigm proposed by J. H. REICHMAN & P. UHLIR, *A Contractually Reconstructed Research Commons* and by A.K. RAI-J.H. REICHMAN-P.F. UHLIR-C. CROSSMAN, *Pathways Across the Valley of Death*, above note [9], recognizes the benefits which can accrue if innovators are ultimately granted property rights over their research contributions and assets; but advocates contractual arrangements which may *ex ante* take care of the risk that players in the research community may engage in strategic behavior of the kind described by anti-commons theory (on which see below notes [9] and accompanying text). A variety of mechanisms is suggested, depending on the specific technological sector to which the arrangements are to apply, which may from case to case be drugs discovery or microbial research. There are recurring features in the design however, among which I should mention the adoption by the different players of standard contractual forms, which contemplate non-exclusive use and access to information resources and research inputs that either are covered by some form of exclusive rights or are *de facto* in exclusive possession of one of the parties; extensive confidentiality agreements limiting access by third parties to the resource; a dichotomy between non commercial, research uses, for all purposes free and commercial uses, subject to a contractual liability rule whereby the party first bringing to the market a commercially valuable end-product is enabled to do so subject to a duty of compensation of the provider of the different inputs which may go into the end product in accordance with a predetermined scale of royalties.

⁴⁹ Resort to hybrid business models is another matter; and would deserve a much more nuanced treatment. For a discussion of IBM’s strategy in this respect see ...

⁵⁰ In the past, I argued that TRIPs mandates a property rule protection for IP: see in *Is There an Antitrust Antidote Against IP Overprotection within TRIPs?* quoted above at note [9], 349 f. I am no longer so sure now: see C. GEIGER, *Promoting Creativity through Copyright Limitations: Reflections on the Concept of Exclusivity in Copyright Law*, in 12 *Vanderbilt J. of Ent. and Tech. Law*, 2011, 515 ff., at 534 ff.

⁵¹ See A. STRATAKIS, *Comparative Analysis of the US and EU Approach and Enforcement of the Essential Facilities Doctrine*, 27 *ECLR*, 2006, 434 ff.; H. HOVENKAMP, M.D. JANIS & M.A. LEMLEY, *Unilateral refusal to license in the US*, in François Lévêque-Howard Shelanski (eds.), *Antitrust, Patents and Copyright. EU and US Perspectives*, Edward Elgar, Cheltenham, 2005, 12 ff. This is not a novel development: recently F.M. SCHERER, *A Half Century Research on Patent Economics*, in *The WIPO Journal*, 2010, 20 ff., reminded us as his beginnings as a patent scholar date back to the post-world war II years in which he set about to investigate R&D rates in the (about 100) firms which had been subjected to compulsory licensing as a result of antitrust investigations.

much more generalized reorientation is taking place in this regard, when the courts – actually: a court as authoritative as the US Supreme Court in *eBay Inc. v. MercExchange, LLC* –,⁵² teach us that injunctive relief for IP violation should not be, and is not, mandatory. In this perspective, the choice between protection under a property or liability rules is to be made case by case.

4.2. *More Extensive resort to private ordering.* Property rules-based technological IP rights may be converted into liability rules not only by dint of legislative or judicial fiat but also by means of private contractual arrangements. The attention over the phenomenon of “contracting into liability”, that is arrangements which transform property rights into contractual claims to a take part in pooled knowledge, technology or creativity or to share income streams derived by the same pooled knowledge, technology or creativity, is comparatively recent, even though the phenomenon as such has a quite long history behind it.⁵³ It appears that resort to pooling arrangements of this kind is becoming particularly recurring in specific areas of technological innovation, such as climate change (Eco-patent-Commons; GreenXchange)⁵⁴ and genetic engineering.⁵⁵ Another significant example is provided by the voluntary pooling of IP assets in the form taken by ventures such as the MIT Media Lab, where a financial contribution gives to the contributor free – if not unregulated – access to the innovation originated anywhere in the common infrastructure.

What is the explanation of these developments? If the incentive theory were totally accurate, then any arrangement other than full property rights, that is unmitigated and full-fledged exclusivity allowing the IP-holder to charge all the price the market can bear by means of market transactions over the IP-incorporating products or services, should appear suboptimal, inefficient and thus unaccounted for. There must be, however, be a reason which explains why in a growing number of occasions legislatures or courts decide that holders of protection over IP assets should confine themselves to a compensation rather than full injunctive relief; and even IP-holders decide that it is best for them to get together and “contract into liability”.

One possible explanation resides in the evolution of the relationship between research and development. It was noted quite a long time ago that the length of the originally extended trajectory which leads from research results, i.e. from the creation of an innovative technology to its application on the market, has collapsed, particularly in areas as life sciences and digital technology.⁵⁶ In the past, it was common to say that the two components of R&D had different weights: one unit of R expenditure used to entail up to 100 of D expenditure.⁵⁷ This is probably still true in selected areas. Pharma would be

⁵² 547 U.S. 388 (2006).

⁵³ See R.P. MERGES, *Contracting Into Liability Rules: Intellectual Property Rights and Collective Rights Organisations*, in 84 *Cal. L. Rev.*, 1996, 1293 ff. Of course, also FOSS and CC are quite conspicuous examples of private ordering, coming from the area of creativity rather than of technological innovation.

⁵⁴ See M. RIMMER, *Intellectual Property and Climate Change*, Edward Elgar, 2011, 312 ff.

⁵⁵ See G. OVERWALLE, *Gene Patents and Collaborative Licensing Models: Patent Pools, Clearinghouses, Open Source Models and Liability Regimes*, Cambridge, Cambridge University Press, 2009.

⁵⁶ In this connection see my *Is There an Antitrust Antidote Against IP Overprotection within TRIPs?* in 10 *Marquette Intellectual Property Law Review*, 2006, 305 ff., at 307-308 where quotations.

⁵⁷ K. JORDA, *The Role of Intellectual Property in Economic, Social and Cultural Development*, in WIPO Worldwide Academy, *International Conference on Intellectual Property Education and Training*, New Delhi, July 11 to 13, 2001, Geneva, 2002, 45 ff., at 57 ff.

a good example of this kind of dynamics.⁵⁸ It is submitted however that such multiplier is nowadays the exception rather than the rule. When the invention essentially consists of disembodied knowledge – be it a DNA sequence or an algorithm – rather than tangible material embodiments, there is no need to go set up plants, factories, production lines, and to go down the learning curve; rather the invention, once secured, may reach the market overnight.⁵⁹ This point may be illustrated by an example drawn from the here relevant field of genetic engineering. The only difficult thing in devising an emergency treatment for a heart attack based on tissue plasminogen activator (TPA), a known substance produced by the body to help the heart to re-vascularize in the first hours after the event, was to identify the DNA sequence which codes for this protein with a view to synthetically producing the protein itself and administering it to early stage patients. Once the TPA sequence is identified, it becomes quite easy to synthesize the desired amount of this protein for treatment of heart attacks.

So, it may be argued – and has been argued – that, to recoup the kind of investment in research (rather than development) which is currently required in cutting-edge technological innovation full exclusivity may not be really needed all the time. Protection under liability rules may still (sometimes) do the trick.⁶⁰

May be so. The reverse is also possibly true and probably more likely: when disembodied knowledge enables immediate access to market, this is a good reason for innovators to demand that the protection is moved upstream, rather than to give up on exclusivity. Indeed, if the trajectory from innovation to market gets shorter for innovators, the same applies to their competitors. To go back to our TPA example, once the DNA sequence is identified, this piece of scientific knowledge is immediately available not only to the innovator, but also to all competitors, i.e. all the other entities who may wish to manufacture and sell the protein. Here the non-IP competitive advantage *de facto* given by lead time is not available.⁶¹ This simple fact explains why life science operators have been clamoring for patent protection;⁶² the political economy of legislative process explains why they have been so successful.⁶³

My impression, however, is that there is a different explanation why the edges of exclusivity are currently been rounded off, by legislatures, by courts and also by private rightholders. This explanation is not related – except in a quite roundabout way –⁶⁴ to the (otherwise probably accurate) point made about the decrease in the amount of investment required in the cycle which leads from research to development and marketing; and would seem to apply not only to technological innovation but also to other forms of creativity, including – once again – copyright-protected creativity. The explanation may be encapsulated in just a few words: in the current environment of creativity and innovation exclusivity tends to backfire. This point needs a to be belabored a little bit, as I will try to do shortly.

⁵⁸ See J. LERNER, *The Patent System in a Time of Turmoil*, quoted above at note [9].

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⁶⁰ [is this the way one should read] J.H. REICHMAN, *Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation*, in 53 *Vanderbilt Law Review*, 2000, 1743 ff.

⁶¹ Elaborate and quote Reichmann

⁶²

⁶³ See M. OLSON, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, 1965.

⁶⁴ On which see below notes [9] and accompanying text.

5. *When Does Exclusivity in IP Protection Backfire?* To make my point I will take a few examples and see which inferences we may draw from them.

5.1. *Patent Wars*. In the last few years, we have been witnessing to an extraordinary increase in patent litigation.⁶⁵ There are of course a number of factors which account for this development. An important factor has to do with the grant of an increasing number of patents which do not concern the end product but discrete complementary inputs, which may be very minor in their contribution to the end product but still may be innovative enough to receive patent or IP protection. That even discrete complementary inputs may receive IP protection is not a novel feature of our systems; rather, this feature has been there all the time and has on other occasions played an important role both in business decisions and public policy making.⁶⁶ What has changed in recent decades is the extent to which such discrete complementary (and often minuscule) inputs may receive protection. The shift towards “upstream” protection we have witnessed to in recent years⁶⁷ has inordinately multiplied the number of entities, be they small discrete inputs of a larger product or fragments of a larger work, which may attract IP protection. It would thus appear that an individual cell phone may be protected by over one thousand separate IP rights. Now, when exclusive IP rights are available over multiple, discrete complementary (and often minuscule) inputs, rather than over end-products, exclusivity tends to “backfire”. When the holders of IP rights over complementary items are more than two, the transaction costs required for their joint exploitations grow exponentially, exactly as anticipated a long time ago by law and economics scholarship.⁶⁸ Sequential monopoly issues arise; strategic behavior, including holdouts, tends to become the norm.⁶⁹ Downstream innovation and creativity suffer, as predicted by theorists of the tragedy of the anti-commons⁷⁰ and now widely documented by patent wars in the fields as diverse as ITC and green technology.⁷¹

5.1.2. *A Brief Detour On Anti-Commons Theory*. As we have come across the theory of the tragedy of anti-commons, we may as well see what this – now quote popular – theory has in store for us. We may begin to understand what the anti-commons argument means

⁶⁵ A.B. JAFFE-J. LERNER, *Innovation and Its Discontents: How our Broken Patent System is Endangering Innovation and Progress and What to Do About It*, Princeton University Press, 2006, and before that J.O. LANJOUW & J. LERNER, *Tilting the Table? The Predatory Use of Preliminary Injunctions*, in 44 J.L. & ECON. 2001, 573 ff. have collated evidence on increase of patent litigation. See also J. BESSEN-M. MEURER, *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators At Risk*, Princeton University Press, Princeton, 2008; D.L. BURK-M.A. LEMLEY, *The Patent Crisis and How the Courts Can Solve It*, Chicago-London, The University of Chicago Press, 2009 and for a review of literature M. RIMMER, *Intellectual Property and Climate Change*, quoted above at note [°], 197 ff.

⁶⁶ R.P. MERGES, *Contracting Into Liability Rules*, quoted above at note [°], 1342 ff. dealing with pooling as a response to conflicting patents on the basic building blocks for car and airplane industries.

⁶⁷ See above notes [°] and corresponding text. [add biotech examples: Long, Ottolia]

⁶⁸ G. CALABRESI-A.D. MELAMED, *Property Rules, Liability Rules and Inalienability: One View of the Cathedral*, in 85 *Harvard Law Rev.*, 1972, 1089 ff. at 1127.

⁶⁹ See C. LONG, *Information Costs in Patent and Copyright*, in 90 *Virginia L. R.* 2004, 465 ff.; J. BESSEN-E. MASKIN, *Sequential Innovation, Patents, and Imitation*, Working Paper, Department of Economics, Massachusetts Institute of Technology, No. 00-01, January 2000, available at <http://www.researchoninnovation.org/patent.pdf>.

⁷⁰ For an early account see M.A. HELLER, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, in 111 *Harvard Law Review*, 1998, 111 ff.

⁷¹ Rimmer.

by considering it turns on its head the theory of the tragedy of the commons, originally advocated by an important article written in the early Sixties by a scientist, Garrett Hardin. In the Middle Ages, he had remarked, stretches of land held in common by the local population were gradually depleted, as they were overgrazed (too much cattle grazing over the same fields) and deforested (too much wood extracted from the communal woods). In his account, optimal allocation was restored by enclosures such as the ones which took place in Sixteenth Century England. As soon as individual owners obtained undivided title over the land, depletion stopped: an individual owner would not disregard the long term implications of depletion, as he himself would bear all the future costs of inefficient use; while, as long as short term benefits were reaped by the commoners individually while the corresponding costs were born by the whole community, the same long term costs were disregarded. A similar situation applied to fisheries, which were running – and indeed still are running, in spite of quotas – the risk of depletion of stock as each fishing fleet ignores the long term implications of overfishing. According to Hardin, in this perspective, the commons, appealing as they may sound to the romantics and to the left leaning, in reality are a tragedy; their opposite number, property rights, are efficient.⁷²

One may wonder what this all has to do with ICT and biotech patents and more generally with IP. The connection may become a bit clearer when I mention that about in the same years one of the most powerful minds behind the Law and Economics movement, professor Ronald Coase, was bent on proving⁷³ that, by protecting the resource with a property right, the law combines the static efficiency Garret Hardin was talking about with dynamic efficiency, as it enables market transactions whereby the resource may move to its highest valued use. From there the argument migrated to intellectual property rights, bringing a forceful argument to bolster the case for the incentive role of exclusivity we earlier discussed:⁷⁴ protection of IPRs by means of property rights contributes to the optimal allocation of resources. The matter gets a bit more complex – and controversial – when the case is made that biotechnological innovation too should be protected by means of patent rights. Fundamental research concerning the double helix may well have originated within the commons of the public, academic research; but when it came to reaping the fruits of the tree of knowledge, property rights, not the commons, would be the most appropriate regime.⁷⁵

Now, this line of argument is, as I was saying, literally turned on its head by those scholars who maintain that protecting innovation by means of property rights may lead to a tragedy opposite and symmetrical to the one elucidated by Garrett Hardin, the tragedy of the anti-commons; and that this may specially be the case in novel fields like digital technology and – indeed – genetic engineering. According to this viewpoint, the tragic features are two. We just dealt with the first one: when IP monopoly is granted not on

⁷² For a classical account of this position see H. DEMSETZ, *Toward a Theory of Property Rights*, in *American Economic Review*, 1967, 347 ff.

⁷³ See R. COASE, *The Problem of Social Cost*, in 3 *Journal of Law & Economics*, 1960, 1 ff.

⁷⁴ For a brilliant treatment see R.P. MERGES, *Of Property Rules, Coase and Intellectual Property Law*, in 94 *Colum. L. Rev.*, 1994, 2655 ff.

⁷⁵ An offspring of this conception was the adoption of rules providing incentives to patenting by Universities, such as the U.S. Bayh-Dole Act of 1980, Publ. L. No. 96-517, 94 Stat. 3015 (codified as amended at 35 U.S.A. §§ 200-212 (2000)), for an assessment of which see A. K. RAI & R.S. EISENBERG, *Bayh-Dole Reform and the Progress of Biomedicine*, in 66 *Law & Contemp. Probs.*, 2003, 289 ff. and R.R. NELSON, *Observations on the Post-Bayh-Dole Rise of Patenting at American Universities*, in *IPQ* 2001, 1 ff.

competing end products, but on many discrete, minuscule complementary inputs which may be incorporated in several end products, transaction costs concerning the authorization to combine several IP-protected inputs into a new product or service are bound to exponentially increase and negotiations, which in principle should lead to the most efficient use of the IP resource, are likely to break down. Exactly for the reasons we just saw.

While this first limb of the theory of the tragedy of the anti-commons is another way to tell the same tale I just went through, there is a second limb to this same theory which gives an additional contribution to our understanding of the reasons why exclusivity may in fact backfire. According to the theory of the tragedy of anti-commons, when IP protection is granted on discrete components which go into an end product, propertization by means of exclusivity may have another kind of adverse impact, by restricting the free flow of information and knowledge which welfare optimality would leave in the public domain. Let us look more closely at this second issue from the vantage point of innovation in agriculture and medicine.

5.2. *Patent Embargos.* While traditionally basic scientific research in agriculture and medicine had for a long time been open and the information resources widely shared by the scientific community, propertization of research outcomes by the grant of patents on agricultural and medical innovation as initiated in the late Seventies or early Eighties is seen as apt to build up barriers to the access and reuse of information and of information-carrying assets and is thus liable to endanger the enormous benefits which scientific cooperation entails.

Let us examine more closely the reasons which usually are given to account for the emergence of this second side of the tragedy of the anti-commons. Once it is established that research outputs may attract IP protection, it is quite predictable that, in such a context, no institution would engage in investment unless it can obtain a legal monopoly on its research outputs, exactly as posited by the supporters of patent protection. However, as several commentators have noted, propertization may also have severely adverse impact upstream and downstream on the innovation process.

Upstream the very possibility of obtaining property rights over research outcomes suggests to all the players that it is advisable for them to avoid organizational arrangements which entail any sharing of information with third parties. Therefore, if the grant of a patent is possible, all interim steps, including materials obtained in the preliminary stages of a research trial or information pertaining thereto, tend not to cross the door of the laboratory, to avoid making disclosures which may prevent patentability and give leads to potential competitors. Even presentation of ongoing research at academic meetings and publication of research findings before patent filings recede for exactly the same reasons. Exchanges may to some extent continue, e.g. in terms of material transfer agreements; but then they tend to be governed by restrictive terms, intended to reserve entitlement over downstream innovation to the benefit of the transferor.⁷⁶ In turn, the process may trigger domino effects: any initial move by one of the players to obtain

⁷⁶ E. BERTACCHINI, *Contractually Constructed Research Commons: a Critical Economic Appraisal: a Critical Economic Appraisal*, in (M. Dulong de Rosnay and J.C. De Martin eds.), *The Digital Public Domain*, Open Book Publishers, Cambridge, 2012, 95 ff., also available at www.openbookpublishers.com/product/93 and at http://www.communia-association.org/wp-content/uploads/the_digital_public_domain.pdf, [rivedere ed inserire Brett Frischman]

exclusive right and to leverage them to secure contractual privileges is bound to trigger defensive reactions by similarly situated players.⁷⁷

An increasing number of commentators have therefore expressed fears that patent protection, when applied to agricultural, medical and genetic engineering innovation, may ultimately entail costs greater than the expected benefits. While in principle property rights may be seen as an efficient tool to induce innovation and enhance market based exchanges over it, it is often feared that the specificity of some areas, including biomedical research and biotech, may lead to the adoption of strategic behavior and to an unacceptable increase of transaction costs.⁷⁸

5.3. *Matching Data Sets*. It would appear that the issues just raised do not concern only technological innovation. Also digital resources (e.g. digital data sets), as we noted, typically form multiple complementary inputs for composite downstream products and services,⁷⁹ which, in turn, may form the basis for additional downstream innovation and moreover tend to be combined in ways which are *ex ante* unpredictable value.⁸⁰ That IP protection, in particular of these special digital resources which are data sets held by governments (Public Sector Information), is bound to generate anti-commons problems is therefore predicted by theory and – unfortunately – confirmed in practice. [expand here; the point is more general than data sets;]

6. *Where Do We Go From Here?* We are in a position now to combine the intermediate results reached in our attempt to reply to the question whether the incentive provided by exclusivity to generate creativity and technological innovation is still needed in the current environment.

6.1. *The Diagnosis*. Our conclusions were that to a large extent cooperation rather than the incentive provided by exclusivity accounts for creativity in the current digital environment, even though this finding would seem to apply only to digital-network driven creativity and not to “legacy” sectors, where the long route still is alive and well and the incentive provided by exclusivity still is successfully at work. We have also seen that these (tentative) findings concern only creativity, i.e. works and products which are candidate to copyright or copyright-like protection.

For technological innovation, which is apt to trigger patent protection and similar “industrial” exclusivity titles, the findings would appear to be even more intricate. We found that, while the erosion of the role of exclusivity as an incentive would not appear to have taken place, still the edges of exclusivity tend to be rounded off either by agreements between rightholders (“private ordering”) or by fiat of courts and legislatures (which often morph property rights into liability-rule protected titles). Among the possible reasons for this “rounding off of the edges” of exclusivity one was identified which is germane to the difficulties identified by theorists of the anti-commons tragedy: exclusivity may backfire

⁷⁷ E. BERTACCHINI, *Contractually Constructed Research Commons: a Critical Economic Appraisal*, quoted above at note #, § 2. [rivedere ed inserire Brett Frischman]

⁷⁸ M.A. HELLER-R.S. EISENBERG, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, above at note #.

⁷⁹ See above § 3.3 In literature see D. NEWBERY-L. BENTLY-R. POLLOCK, *Models of Public Sector information provision via Trading Funds*, quoted above at note [°], 21 ff.

⁸⁰ See above the second remark in § 3.

when it protects discrete complementary inputs rather than end-products, as it tends to happen more and more often in the current innovation environment.

6.2. THE TASK BEFORE US. If this diagnosis is accurate, then the task before us is daunting. Only one thing is crystal clear: that the set of rules which prevailed in the last few centuries are no longer up to the task of delivering the amount of that peculiar public goods we understand under the labels of creativity and innovation which is optimal for society. The current system is broken down and turns out to be in large part dysfunctional in the current environment. It still gives full-fledged and unmitigated exclusivity even in these areas (digital network driven creativity) where the incentive of exclusivity is no longer needed;⁸¹ by giving full-fledged exclusivity even to discrete fragments or inputs, it creates obstacles to that very cooperation between peers which has in the meantime emerged as a veritable engine for creativity along the short route.

While the incentive given by exclusivity still proves to be essential in several “legacy” segments of creativity and along the whole spectrum of technological innovation, moves to locate IP protection upstream, to protect discrete inputs or fragments of innovation and creativity, ends up granting exclusivity exactly where exclusionary power in the hand of rightholders tend to backfire. The problem is partly addressed by moves to convert property rights into liability rules by means of private ordering and by legislative or court intervention, which, while mitigating the adverse impact of generalization of exclusivity, still leave the greatest part of the anti-commons tragedy unsolved.

6.3. An Agenda For Future Action. This unfortunate situation opens up an immense field of research, in the quest for ways to fix our broken system of creativity and innovation. While it may be said that the research to redesign the legal rules is well under way in a number of areas, in this context I will not try to engage in the task of reviewing all the literature which has proposed the design of a more functional system to promote creativity and technological innovation.⁸² Rather, I will confine myself to two – indeed very ambitious – tasks, one general and the other specific. The *first* task consists in the effort to draw a tentative map of the elementary components, or building blocks, which would appear to go into the design of rules appropriate to the new paradigm of creativity and innovation.

An interesting question concerns the identification of the players who should be involved in the re-design. It is not altogether clear what are the roles to be played in this connection by nation States, regional entities and international organizations, on the one side, and by private players, on the other. An adequate recognition of the significance of private ordering to untie the knots tied by “ancient regulators” should make us wary of putting too much hope on the contribution which can come from sovereigns. On the other hand account should be taken of the fact that the issues at hand have a global scope, so that the design should concern global rules: from international conventions all the way down to domestic legislation passing through any relevant intermediate level (e.g. EU law); nor should we forget that global rules may also be fashioned bottom up and not only top down. It is submitted that the identification of the appropriate level where legal change may take place is best left at a stage where the building blocks of the new system

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⁸² See however ...

have been at least tentatively identified. Indeed, it would appear that there is no such a thing as a theory of the optimal level of legal change.⁸³

While most, if not all, the components which go into this map have to do, as we shall presently see, with the re-shuffling of cards which belong to the traditional IP stack, the *second* task goes beyond this perimeter as it extends to an area of private law which lays at the extreme boundaries of the toolkit of IP lawyers. Here I will address an issue which has to do with the private law corollaries of the new landscape of creativity and innovation and which may be summarized as follows: if we assume for a moment that, in particular in the area of creativity, and at least in those segments which are driven by digital networks, the tool of cooperation has replaced the incentive hitherto provided by exclusivity, then what are the implications of this shift in terms of the mechanisms provided by private law to carry out the transactions which enable cooperation? Here we do not have to build from scratch, as we have the possibility of building from the growing body of case law, legislation and literature concerning digital licenses of the second variety.⁸⁴ However, here there is still a vast number of conceptual and operational issues to deal with, which go from the relationship between digital licenses and contracts to the role played by unilateral, non-contractual acts in our legal systems.

6.4. *THE COMPONENTS OF THE IP GOVERNANCE OF THE NEW PARADIGM. TOWARDS A TWO-SECTORS SYSTEM?* Before going into these private law corollaries of the new paradigm, however, we should first try, as anticipated, to map the components which go into the IP governance of this paradigm itself. As I will presently try to do, in an admittedly cursory and short-hand and therefore unsatisfactory way, leaving the task of filling in the voids by way of reference to current literature and to work in progress.⁸⁵

To begin with, any effort to design a system intended to secure the appropriate level of creativity and innovation in the current environment must accept that the system itself requires that two separate mechanisms for promoting the desired goals are in place *and* are capable of functioning together and coexist.

Full-fledged exclusivity would still place a crucial role in the first mechanism. The incentive provided by it is still required at least where a substantial amount of outlay and investment is required to reach the market. This is still the case for the “legacy” segments of copyright industries and for many of the areas of technological innovation.

This does not mean that we may accept the continued existence of full-fledged exclusivity across the board. First, full-fledged, unmitigated exclusivity is no longer necessary where exclusivity does not provide an incentive to creativity. Here exclusivity may still be necessary, but to a much lesser degree: to the extent as it may be used as a tool to open, rather than to restrict.⁸⁶ This is where the second mechanism comes in.

Also where full-fledged exclusivity is still required, we have to take into account that this more expansive form of creativity requires some kind of rounding off at the edges. This is particularly necessary, because in our current environment IP protection has

⁸³ Say something on subsidiarity; and of alternative use normative of regulatory competition. Also: look again at Johnson & Post in connection with the ancient regulators; and at Helfer in connection with the fora for legal change.

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⁸⁵ Citare i miei lavori.

⁸⁶ § 3.2.

moved upstream,⁸⁷ maximizing the risk that exclusivity backfires and hampers the possibility of market transactions enabling the combination of complementary discrete inputs.

The governance of the new IP system should be based on three pillars.

6.4.1. *The First Pillar of the Two-Sectors System: Extensive Resort To Private Ordering.* In the past, private ordering has been crucial in sorting out many of the bottlenecks arising out of the current system of IP protection. The role of private ordering should be expanded, to fully take advantage of the superiority of decentralized, bottom-up choices over top-down regulation. Enabling private ordering requires giving all the players an initial choice: they may opt in for full-fledged exclusivity, if subject matter and access requirements are met; they may opt out of any form of protection, if they wish to relinquish their creations and innovations to the public domain. Between these two extremes a default rule would apply, which entails the modicum of exclusivity required to open rather than to restrict. We already referred earlier to this sort of lesser exclusivity;⁸⁸ I note here that a default rule providing for it – in the spirit of what I referred half a decade as Copyright 2.0 –⁸⁹ is essential for private ordering. This is so because, as noted earlier,⁹⁰ a minimum of IP protection is required as a basis to enforce compliance with licensing conditions; and open licensing, mandating free and unfettered re-use of the resource, would remain pointless and without effect, if compliance was not enforceable.

6.4.2. *The Second Pillar of the Two-Sectors System: (More) Extensive Resort To Liability Rules.* It has been noted that providing for a default rule as just suggested would be of no avail, if the working of the default rule was not accompanied by some device able to mitigate the adverse downstream effect full-fledged exclusivity might still entail, if not appropriately contained.⁹¹ This is certainly a point well taken: arrangements in one sector are bound to be of limited help towards revitalizing the flow of creativity and innovation, unless they are appropriately interlinked with the working of the other sector. This may be accomplished in a number of ways. The *first* one has just been mentioned: paving the way to private ordering. Indeed, as private ordering has been able in the past to untangle several IP knots, it holds in itself the possibility of opening up many of the roadblocks ahead, by facilitating contracting into liability (including enabling the emergence of contractually reconstructed commons in cutting-edge areas of technological innovation).⁹² *Second*, the conventional tools to convert property rules into liability rules (compulsory licensing, antitrust remedies to refusals to deal in IP)⁹³ should be fine-tuned.⁹⁴ *Third*, the

⁸⁷ Explain here, but possibly better before, why the same developments which led to the features of non-rivalry in production, complementarity and *ex ante* lead to moving upstream.

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⁸⁹ See my paper *Copyright Policies for Digital Libraries in the Context of the i2010 Strategy*, quoted above at note [9].

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⁹¹ Montobbio.

⁹² As proposed by J. H. REICHMAN & P. UHLIR, *A Contractually Reconstructed Research Commons* and by A.K. RAI-J.H. REICHMAN-P.F. UHLIR-C. CROSSMAN, *Pathways Across the Valley of Death*, above note [9].

⁹³ On which see § 4.1.

⁹⁴ There should scope for jurisdictional variations in the administration of antitrust remedies, for the reasons I explored in *Is There an Antitrust Antidote Against IP Overprotection within TRIPs?* quoted above at note [9]. [more generally discuss which steps are global and which ones are municipal or regional; the approach is that we do not decide in advance, rather we first see what is the governance level; and from this analysis we derive the locus of the legislative agenda]

mechanism of limitations and exceptions should be rethought, in a number of ways which, as I argued elsewhere,⁹⁵ include the establishing of the boundaries between the old and the new continent of creativity and innovation and the flow of resources from the former to the latter and vice versa.⁹⁶

Important as they may be, all these ways to rethink the respective costs and benefits of property and liability rules finally amount to small change if compared to the really core issue, whether judges have to engage in a balancing exercise when deciding whether to grant injunction or award damages for IP violation. To make a long story short, my idea here is that the US judges have it right; EU Courts do not.⁹⁷ Except, of course, that European judges' hands are tied up by old fashioned rules which bind them to the old-fashioned idea that exclusivity is *always* protected by a property rule. May be the time has come to rethink just this essential notion.

6.4.3. *THE THIRD PILLAR OF THE TWO-SECTORS SYSTEM: INFRASTRUCTURE.* There is a number of design principles which must be followed to ensure the robustness of the two-sectors system I propose. Let me sketch out a list:

(i) *net neutrality.* The web constitutes a global public good available for both sectors; and, if it is to retain its capability to function as a engine of innovation, it has to retain the end-to-end design.⁹⁸

(ii) *ISP providers* are fundamental intermediaries between different categories of users of the net. Whatever *liability* may be imposed on them must take into account that their job is not only to enable price-based market transactions but also to enable digital-network driven cooperation. Rules which chill their freedom to experiment in response to the needs of non-market players should pass a high-level of scrutiny before being adopted.⁹⁹

(iii) in specific connection with copyright and copyright-like sectors, collective rights management organizations (CRMOs) have traditionally operated as intermediaries between rightholders and users helping to negotiate the long route which leads from the former to the latter. In the current digital environment they should expand their mission to act as intermediaries also on behalf of creators operating along the short route, thereby avoiding the risk of being doomed to irrelevance.¹⁰⁰

(iv) also *competition law* has an important role to play, particularly in that intermediate area where traditional businesses' price-based market transactions meet the "hybrid" business models favored by creators operating along the short route.¹⁰¹

⁹⁵ In *IP Limitations and Exceptions and Competition*, quoted above at note [9], at 334 ff.

⁹⁶ This is not an exhaustive list, though. A notion which would appear to be worth exploring lies in the concept of *immunity*, which could be employed to guarantee a non-infringing status to production and sale of germplasm which is the original basis for follow on innovation. For details of this concept, which would avoid the difficulties involved in conferring

⁹⁷ Compare *eBay Inc. v. MercExchange, LLC*, 547 U.S. 388 (2006) to the unfortunate decision of the ECJ 27 April 2006, in Case C-145/05, *Levi Strauss & Co. v Casucci S.p.A.*, in ECR 2006, I, 3703 ff., case «mouette». [future development: discuss here how this ties to the question of damages; as Judge Posner put it, if it is not a 1 billion cheque, but 25 cents per item, then also injunction is not in place]. It would seem that more recent provisions, such as Art. 62 of the Agreement on a Unified Patent Court signed February 19, 2013, finally gives European Judges more leeway.

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(v) an expansive *public domain* should be secured, to guarantee access to a vast pool of genetic resources, data, information and knowledge, to be freely re-used and recombined by agents in both sectors;¹⁰²

(vi) the existence of shared resources and the recognition of the importance of the goal of enabling the interactions between resources belonging to the two different sectors is at the basis for the growing concerns for *interoperability*.¹⁰³

This is clearly an incomplete and sketchy list of the infrastructural requirements which are needed to ensure an equitable, efficient and sustainable interaction between the two sectors. Nor am I sure that their conceptualization may be best organized along the lines proposed by theorists of the knowledge commons¹⁰⁴ or by literature on the increasing role of infrastructure.¹⁰⁵ While a lot of work still is required to start focusing on the conceptual framework necessary in this connection, it would appear to me that the time has come to re-conceptualize the role played by non-market global public goods which provide the basis for the interaction between the two sectors.

6.4.4. *An Agenda For Legal Change.* Defective and incomplete as it may be, this list of components enables us to start visualizing the *forum* – or rather: the *fora* – where legal change may conceivably be initiated and advanced. Clearly, the provision of global public goods hardly is a matter for private actors and nation States: the setting up of a system for the preservation and enhancement of global genetic resources for food and agriculture requires action at the global intergovernmental level.¹⁰⁶ However, it would appear that in some cases legal change is best initiated at the regional level. As I argued elsewhere,¹⁰⁷ the EU does have the right incentives and the prestige to take an initiative to replace the 1886 Berne Convention on copyright with a Berne II initiative, adopting the Copyright 2.0 approach which is becoming more and more mainstream. In other regards, the optimal contribution to legal change may come from regulatory competition. One would imagine that in this regard the various antitrust authorities operating around the globe and attuned to the specific needs of their constituencies may turn out once more to be the laboratories of legal innovation which were hailed by Justice Brandeis in his first dissent in *Liebmann*.¹⁰⁸

The importance of bottom up action by private players, in particular to resort to private ordering to accomplish *via* voluntary arrangements and decentralized decisions the optimality which regulators botched, can hardly be overestimated. If one is allowed

¹⁰² Explain the relevance of TPGRFA.

¹⁰³ See in this connection J. PALFREY-U. GASSER, *Interop. The Promise and Perils of Highly Interconnected Systems*, Basic Books, New York, 2012.

¹⁰⁴ See C. HESS-E. OSTROM, *Introduction: An Overview of the Knowledge Commons*, in C. Hess-E. Ostrom (eds.), *Understanding Knowledge as a Commons. From Theory to Practice*, MIT Press, Cambridge-London, 2007, 3-26.

¹⁰⁵ B.M. FRISCHMANN, *An Economic Theory of Infrastructure and Commons Management*, in *Minn. L.R.* 2005, 917 ff.

¹⁰⁶ Again references to TPGFRA.

¹⁰⁷ *Consume and Share: Making Copyright Fit for the Digital Agenda*, in (a cura di C. Geiger), *Constructing European Intellectual Property. Achievements and New Perspectives*, Edward Elgar, 2013, 314 ff. at [8].

¹⁰⁸ According to Justice Brandeis two famous dissents, regulatory competition may oscillate between two extremes. Either the different competing jurisdictions are seen as laboratories experimenting diverse legal rules to strike whatever balance between conflicting interests appears appropriate to the relevant constituencies (*New State Ice Corp. v. Liebmann*, 285 U.S. 262, 311 (1932)). Or, in the alternative, they may engage in a “race of laxity”, *Louis K. Liggett v. Lee*, 288 U.S., 517, 557-559 (1933), to favor concentrated interests (typically: business interests) or cut down on dispersed interests (typically: outside investors’, consumers’). Until we do not know which outcome is to prevail, we cannot decide whether regulatory competition is a good thing or a bad one.

once in a while to say something slightly over the top, then I should say that we have reasons to fear that this time the lobby of horse driven carriage owners will prevail over railways; and that the hope that this will not be the case may be placed more in the hands of the users of the IP-system, which ultimately means the public, than in the wisdom of sovereigns and international organizations.

7. *Private-law Tools Enabling Digital-Network Driven Cooperation: A Theoretical Framework.*

One component of the two sector-system which I did not mention, even though it has a crucial importance in the design of the system, as I earlier indicated,¹⁰⁹ is the identification of the private law tools enabling digital-network driven cooperation. Let us now turn to this selected – if rather expansive – issue.

7.1. *From Goods To Acts.* This is quite a jump. IP lawyers usually deal with goods. These may be either the ideal entity (the *corpus mysticum* we referred to earlier) or the *corpora mechanica*, be they tangible or intangible, in which the former is incorporated. The attention devoted by IP lawyers to transactions over IP is somewhat muted. Assignment and licensing concerning IP rights, as well as cooperative arrangements among rightholders and between rightholders and users,¹¹⁰ do play a certain role in their landscape; less so transaction concerning IP-incorporating products and services. After all, who would thinking of engaging in extensive research and discussion of sales of Coca Cola bottles, of brakes and of books, even though some corners of these transactions from time to time do deserve scrutiny from an IP perspective.¹¹¹ In the last few decades, this attitude has in part changed. It has dawned on us that particularly in one corner of our province there are transactions which impact not only on the good or service provided, but also on the IP incorporated in them. Typically this is the case of dealings between the rightholder and the end-user concerning copyright or data-base protected entities: software license agreements, contracts providing for access to data bases, music store delivery of music “tracks” or allowing music to be streamed, for a price, for free or by means of that hybrid, dual market, form which links delivery of content to exposure to advertising. In all these regards the literature – and before it the case law – have taken off.¹¹²

This development is very much welcome, in the perspective of bringing IP transactions up to date in a digital context. Indeed, the internet is, among other things, a machine for the exchange of IP-incorporating goods and services.

However, there is a whole area which should not escape out attention. Reference is here made to the transactions which may deal with IP rights or with goods and services incorporating IP and which may take place over the net, and still are neither contracts, nor agreements nor otherwise contractual arrangements. These transactions may be referred in

¹⁰⁹ At § 6.3.

¹¹⁰ Including, of course, the increased attention to the forms of “contracting into liability” we earlier referred to: see the important contribution by R.P. MERGES, *Contracting Into Liability Rules*, quoted above at note [9], as followed up, among others, by J. H. REICHMAN & P. UHLIR, *A Contractually Reconstructed Research Commons* and by A.K. RAI-J.H. REICHMAN-P.F. UHLIR-C. CROSSMAN, *Pathways Across the Valley of Death*, above note [9].

¹¹¹ One recent example would be the decision by European Court 14 July 2011 (First Chamber), case C-46/10, Viking Gas A/S c. Kosan Gas A/S, case «gas bottles», concerning the issue whether the sale of a gas bottle intended for refilling triggers exhaustion.

¹¹² Just a few quotes, including winternitz and the others already quoted.

several ways: acts which are not contractual, obligations arising out of acts which are non-contractual or, resorting to a probably more self-explanatory and possibly customary locution, “unilateral acts”.¹¹³

The reason why the legal artifacts we label as “unilateral acts” are important in the current landscape of IP are the same why they are comparatively neglected. Usually the attention is drawn towards price-based market exchanges concerning IP or IP-incorporating goods or services taking place over the net, or, at least, to these market transaction having the same characteristics and which provide for some sort of consideration (including exposure to advertising). However, the metrics indicate that this is but a fraction of the transactions over IP or IP-incorporating goods or services taking place over the net. The bulk is indeed coming from a different source: cooperation over the net. This is so for a very simple reason: the short route is taking over the long route. As earlier indicated, the stage scenario has indeed changed: social sharing enters; business recedes. We cannot fail to recognize this shift: however successful may a re-design of IP rights turn out to be, it still would be to a large extent vain, if the tools required to carry out transactions dealing with them or with goods incorporating them were not up to the task.

7.2. *Three Structural Features of the Second Variety of Digital Licensing.* The time has therefore come to have a closer look at the legal contours of the transactions which are taking place along the short route and are substantiating sharing.

A good starting point for doing this is to consider what we earlier described as the second variety of digital licensing. It is true that not all forms of sharing take place under CC, OKF or GPL conditions; but the terms and conditions stipulated by these very popular transactional tools may give a good approximation. This is confirmed by the metrics (over 400 million works are reported to be licensed under CC)¹¹⁴ and by the qualitative data, including the “virality” feature which would appear apt to push the rate of adoption of copyleft licensing.

On this basis, we should go back to the contrast we instituted between classic licensing and the first variety of digital licensing on the one side and the second variety of digital licensing on the other side.¹¹⁵

In this connection we shall consider three features. The first one, (a), has to do with the social determinants of the phenomena; the second and the third one, (b) and (c), with their technological determinants.¹¹⁶ In doing so I will put on the lenses of Italian municipal law; but, in doing so, I will not fail to ask myself eventually whether this perspective is apt and appropriate in connection with the digital and global features of the phenomenon we are dealing with here. Anyhow, let’s get down on the mechanics of the business at hand first.

- a. *(Lack of) consideration.* Typically classical licensing and the first variety of digital licensing consist in price-based market transactions which provide for payment of consideration: a royalty or the payment of some other form of price or fee. This feature accounts for the fact that normally – if not always –¹¹⁷ these licenses come in

¹¹³ Piccola ricerca di diritto privato inglese e US.

¹¹⁴ See <http://wiki.creativecommons.org/Metrics> (last visited January 5, 2013).

¹¹⁵ § 3.2.

¹¹⁶ See respectively §§ 3.4 and 3.3.

¹¹⁷ Consideration may occasionally lack in trade mark licenses (M.S. SPOLIDORO, *La legittimazione attiva dei licenziatari dei diritti di proprietà industriale*, in AIDA, 2006, 219) and in connection with the so called releases,

the form of a contractual agreement. In contrast, FOSS, CC and other alternative licensing forms typically do not contemplate payment of sums; they are tools either for making available digital resources for free over the net or to contribute small grains of creativity towards some cooperative enterprise.¹¹⁸ This characterization goes a long way to account for the fact that normally these licenses do not come in the form of contractual arrangements, or agreements, but rather in the form of unilateral acts. Whether this act is visualized as an unilateral act, as a license, or a waiver, depends on a number of factors, which vary in the different legal systems. A common denominator is at work here, however: the license is based on an unilateral act from licensor to the benefit of the licensee.¹¹⁹

- b. *Parties*. In the second variety of digital licensing, licensor authorizes, under the terms and conditions of the license, not only the initial licensee, but also all the other third parties who may at some point of the chain obtain a digital copy of the licensed content or work. Characteristically, licensor directly authorizes whomever may happen to re-use a digital copy disseminated by a licensee in accordance with license terms and conditions, rather than authorizing licensee to further sublicense the copies she may have been authorized to re-use.¹²⁰

Technologically, this feature is made possible¹²¹ by the fact that the initially licensed file, which can be multiplied into innumerable perfect copies as it is digitally disseminated across digital networks, carries with it metadata; and that these metadata in turn point to the automatically reprocessable metadata built in the license under which the file is released. We come to realize this if we look again at the “open definition”: there the quality of being “open” is referred to “a piece of data or content”, which is defined as open “if anyone is free to use, re-use or distribute it”.¹²² Thus, it is *the digital resource* which is free, that is, under the terms and conditions of the license; and this freedom applies to the same resource in connection with the fact that the resource as such is obtained, regardless of the identity of the person or entity that has been the prior, intermediate link to deliver the resource and of the person or identity that receives it. I will later refer in greater detail to “travelling” clauses and waivers. At this stage I will confine myself to stating that the terms and conditions of the license “travel” in the sense that, as the digital resource is multiplied by being made available across digital networks, the persons or entities at the receiving end are authorized to re-use the resource under the terms and conditions which are attached to it through the metadata which accompany it.

From a legal viewpoint, it should be underlined that this approach is based on a direct license between the rightholder/licensor and the additional,

i.e. unilateral authorizations to use images and copyrighted work [on which see G. RESTA, *I diritti della personalità*, in G. ALPA-G. RESTA, *Le persone e la famiglia*, 1 *Le persone fisiche e i diritti della personalità* in *Trattato di diritto civile* diretto da R. Sacco, Torino, 2006, 361 ff., at 639 ff., and I. GARACI, *I contratti per lo sfruttamento del nome e dell'immagine. Parte generale*, in A.M. Gambino (ed.), *I contratti di pubblicità e di sponsorizzazione*, Giappichelli, Torino, 2012, 111 ff., at 116 ff.].

¹¹⁸ § 3.4.

¹¹⁹ Or, rather, the licensees: see lett. b. below.

¹²⁰ See e.g. Art. 8 CCBY.

¹²¹ Or, indeed, determined: I suspect that my account incorporates some dose of technological determinism which at some point I should come to grips with.

¹²² See <http://opendefinition.org/> (bold added).

downstream licensees. This direct license, which we may visualize as *per saltum* as it jumps from licensor to each downstream licensee “over the shoulders” of the licensee through which the digital file or fragment has been obtained, it is in stark contrast to what happens in classical licenses and in the first, proprietary variety of digital licensing.

In classical licensing, the possibility of the licensing of additional, downstream licensees is not altogether ruled out. But it must rely either on a direct contact between licensor and the additional licensee or licensees, or, in the alternative, on a chain of authorizations, which then takes the form of sublicensing from licensee to downstream sublicensees rather than of direct licensing from licensor to additional licensees.¹²³ Therefore, sublicensing must be contemplated and agreed to in the original arrangements between licensor and the first licensee. Being the result of a chain of authorizations, the title of the sublicensee depends on the title of sublicensor; should the original license be terminated, also the sublicense would be automatically lose its very basis.

In proprietary digital licensing, sublicensing is always contractually prohibited. The same prohibition applies to assignments. Third parties who obtain the digital goods from licensee are infringers; full stop.¹²⁴

- c. *Subject matter.* As a rule the subject matter of classic IP licensing is a specific IPR, be it a trademark, a patent, a copyright, or another IP-protected entity. It is not unusual that the license extends to larger units. It may encompass “packages”, that is different IP rights: thus a patent license may be accompanied by a know-how license; licensee may be authorized to use patentee’s trademark on the patent incorporating products; and so on. Also portfolios, rather than individual IP rights, may be licensed. Actually, this is common practice in some sectors, particularly in patent licensing, where the licensing of entire patent portfolios has become current practice.

In the second variety of digital licensing, the direct authorization from licensor to additional, downstream licensees extends to smaller units: also to any *fragment* of the digital copy which is re-used by licensee,¹²⁵ except in cases where only the re-use of the digital asset in unchanged form is allowed. Indeed, only entities which would not attract protection are not encompassed by the terms and conditions and the license and therefore are not authorized, for the simple reason that their re-use does not require authorization.¹²⁶

7.3. *From Contract to Unilateral Acts.* We may now finally come to grips with the legal segment of the analysis. The economic rationale at the basis of the second variety of

¹²³ On sublicensing see P. RESCIGNO, voce *Contratto (in generale)*, in *Enc. Giur. Treccani*, vol. IX, 1988, 30. See also for extensive reference to case law A.G. DIANA, *Il subcontratto*, Utet, Torino, 2003 and the wide theoretical framework sketched by C.M. BIANCA, *Diritto civile*, III, *Il contratto*, Giuffrè, Milano, 2000, 728 ss.

¹²⁴ This at least in the intention of licensor; for an alternative view, reached by European case law, see EU Court 3 July 2012 (Grand Chamber), case C-128/11, *Used Soft c. Oracle International Corp.*, «Used Soft». For a thoughtful commentary of this case see R. RIVARO, *L'applicazione del principio di esaurimento alla distribuzione digitale dei contenuti protetti*, in *Giur. comm.* [9] and TH. VINJE-V. MARSLAND-A. GÄRTNER, *Software Licensing After Oracle v. Used Soft*, in *CRi* 2012, 97.

¹²⁵

¹²⁶ Of course, in all forms of licensing the authorization to use the entire entity encompasses the right to use only parts of it. What is characteristic of the second variety of licensing is that the authorization extends to re-use of the fragment as such, and not as a component of the entire work.

licensing also helps to understand the reason why the tool of election used by licensors to engage in a transaction – or, more to the point, a series of transactions – with licensee(s) is not a bilateral agreement, or contract, but an unilateral act.

Earlier, we noted that that digital licenses of the second variety, in opposition to all other licenses, do not contemplate *royalties*, fees, a price or consideration. We are in a position now to see why this is so: the lack of consideration does not indicate that the transaction has a purely altruistic and other-regarding basis but that it is not a price-based market exchange, or, may be more accurately, that it is a non-market transaction which is part and parcel of an economic and social production mode based on cooperation and sharing.

This fact goes a long way, as we noted, to explain why a contract is not strictly necessary here. Of course, if licensee were to undertake to make a payment; or even were to make a payment, the combination of licensor's grant and of licensee's payment would inevitably amount to a contract. But this is not the case here, where by definition no money changes hands. We should pause for a moment to look at the implication of this – quite extraordinary – feature.

To begin with, licenses of the second variety are “non-transactional”. Even when the digital resource is made available over the net, the grant of the license does not require any form of acceptance, including the otherwise usual “clicking” normally required of licensee to indicate acceptance by the licensee herself of the terms and conditions of the license. The digital resource automatically comes with the terms and conditions of re-use attached, by the combination of metadata the resource carries along within itself and the automatically reprocessable metadata built-in in the license. A “non-transactional” mode is seen as the best way to foster the widest dissemination possible of the digital resource.

There is an additional ground why digital licenses of the second variety tend to avoid contract and to favor unilateral acts. The same clause binds the initial licensee as any subsequent licensee; the same waiver benefits the initial licensee and the subsequent ones. This effect, which is a necessary implication of open licenses,¹²⁷ is best reached by having the clause and the waiver spelled out once and for all by licensor by way of an unilateral act (i.e. by reference to the original license terms) and of incorporation by reference in the metadata which travel along with each digital file or fragment of file.

It is important to spell out why in this connection a contract would not do the trick. There are two reasons why contract turns out not to be the appropriate tool to reach this end. Only the second is really compelling.

The first difficulty which comes to the mind is located at the receiving end. One may begin to wonder how we may possibly have a meeting of the minds when downstream licensees, incorporating the digital fragment in their own product or service, may hardly be deemed to be “consenting” to the terms and conditions of the license. This is however not necessarily a hurdle which cannot be overcome: legal systems, including the Italian one, have long devised a mechanism whereby, where the transaction is only liable to benefit the other party without entailing burdens to the same, a contract may still come into being where the other party is made aware of the offer and is in a condition to refuse it: *see* Art. 1333 of the Italian Civil Code.¹²⁸ The re-user of the digital file (or of the

¹²⁷ As explained at § 7.2, lett.a. (but is bound to lead to the difficulties examined in § 8).

¹²⁸ It has been noted that Art. 1333 is intended to expand the notion of contract in a way which may be reconciled with the assumption (“dogma”) whereby no changes into the economic sphere of individuals or

digital fragment) to which travelling terms and conditions are attached by dint of metadata may hardly be deemed to be refusing them. Therefore, if we confine ourselves to looking at the receiving end, we may still think up of ways to infer some form of consent, even though this may turn out to be rather fictive or fictional. So this hurdle to devising a contractual relationship may still be overcome.

However, the real difficulty is to be found, maybe rather surprisingly, at the sending end. As digital files and fragments travel around the cyberspace, it becomes rather difficult – if not impossible – to assume that there is a meeting of the minds between a licensor, who does not know or even imagine (and cannot even find out, even if she tried) the identity of the person or entity that happens to obtain a digital copy of the file or of the fragment (the downstream licensee), on the one side, and the same licensee, on the other side. It is true that at the turn of the last century contract law successfully faced another situation where offeror had no idea of the identity of her counterparties; and devised the legal device of the offer to the public (in Italy: Art. 1336 of the Italian Civil Code) to deal with it. It is well known that this development was triggered by the diffusion of the *Automaten*, the automatic machines which originally dispensed tickets and goodies against cash and was later extended to Automated Teller Machines, which effect the exchange of cash against debt.¹²⁹ However even the expansionary potential of contract law shown at this junction has its outer boundaries: if we may plausibly conceive of a contract between the comptroller of the automated machine (X) and the (unidentified) user of the same (Y1), it is submitted that it is much more difficult to conceive of a corresponding mechanism whereby a contractual exchange may be deemed to take place further down the line, between the same X on the one side and Y2, Y3 and so forth on the other, once the tickets or the goods exit the automated machine and travel around out of control of their initial seller.¹³⁰

I suggest that this difficulty may be greatly mitigated, or even overcome, when resort is made to the tool which in market-exchange based economies has hitherto been the lesser brother of contract, namely the legal artifact we designate as unilateral act. While this instrument appeared to be recessive in systems which took exchange as the central paradigm of economic activity and built around it the legal framework for private transactions, it may well be that the tide is now turning as the formerly dominant price-based market exchange is being complemented and at times replaced by the new sharing economy.¹³¹ Both giving away for free one's music, photo or audiovisuals (gift) and sharing do not require that any given contribution is matched by a flow of resources going into the opposite direction; in particular, the magic of sharing operates when many discrete contributions seamlessly complement each other to bring about private and public goods, or a mix of them, which would not be available without the combination of these discrete contributions and which ultimately make the contributor richer rather than poorer

entities may be affected without their consent: see in this connection L. BIGLIAZZI-GERI-U. BRECCIA-F.D. BUSNELLI-U. NATOLI, *Diritto civile, 3. Obbligazioni e contratti*, Utet, Torino, 1989, 528.

¹²⁹ For a discussion of this development see C.M. BIANCA, *Diritto civile, III, Il contratto*, Giuffrè, Milano, 2000, 247.

¹³⁰ A possible way out is offered however by the route followed in figuring out a contractual relationship between the software holder on the one side and the end-user, who obtains the physical copy through an intermediary, in shrink-wrap cases: see in U.S. case law *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447 (7th Cir. 1996); for further references see my *Software e limitazioni delle utilizzazioni del licenziatario*, in *AIDA* 2004, 358 ff., at 370 ff.

¹³¹ See above § 3.4.

than at the beginning of the cycle. In such a context, it may well be that the time has come for unilateral acts, which offer the nuts and bolts for building a framework of contributions without immediate reciprocation, to take the floor.

Coming back from metaphysics to the microphysics of private transactions, it would seem that the tool provided by unilateral acts may do the trick much better than contract in accounting for the functioning of the second variety of digital licenses in general and specifically for the institution of a legal relationship between licensor and licensee by way of what I earlier (in § 7.2, lett. a.) called direct licensing.

Indeed, in our legal system, before a contract becomes effective, a non-unsubstantial number of requirements has to be met: offeree must have had a chance to refuse the offer; therefore he must have been put in a position to be aware of it; plus, the offeror must have made the offer to begin with, which is an occurrence which can be easily taken for granted in the bricks-and-mortar world;¹³² but may be much more difficult to conceive of in a digital world where digital files and fragments are sloshing around.

In this specific connection, the legal framework for unilateral acts (at least in our legal system) is much less demanding. It is true that in principle also unilateral acts take effect only from the moment when they come to the knowledge of the person or entity they are intended for, Art. 1334 of the Italian Civil Code. However, our legal system provides by way of exception for several subsets of unilateral acts where the effect of the act itself is immediate and does not require at all knowledge by a specific addressee (or addressees). This is the case of unilateral promises, Artt. 1987 ff. of the Italian Civil Code, which include, under Artt. 1989 ff., promises to the public, which are deemed effective and binding on promisor in the very moment in which the promise is made public.¹³³ The same rule as to the time in which the obligation sets in applies to waivers: which are believed to be unilateral acts which are effective before and even without being brought to notice of the party – or parties – which may ultimately benefit from them.¹³⁴ It seems to me that promises to the public and waivers, or, to the extent admissible,¹³⁵ other unilateral acts may form a quite reliable basis for direct licensing: they are binding on the rightholder-licensor from the moment the terms and conditions are promulgated by the same. As the digital file (or fragment) carries with it the same terms and conditions, whoever re-uses the same digital file (or fragment) becomes a licensee, in spite of the fact that she has no direct contractual relationship (and certainly has had no dealing) with licensor.

This does not mean that the route of unilateral acts is there just to embark upon, to overcome all the difficulties which typically are to be met by resorting to contract. Fact is that, while contracts are large, well explored auto-routes, which we are familiar with after a long, long time of experience, unilateral acts still are, in our systems, including the Italian one, minor byways, not much frequented and possibly in a state of disrepair.

Not only this; it is also quite clear that the legal system, or the way past commentators have interpreted it, incorporates a certain amount of suspicion towards contract's lesser brother, the unilateral act. Thus, it was held, particularly in the past, that unilateral acts are typical, i.e. admissible to the extent specifically provided for by the

¹³² And here might lay the difference to shrink-wrap cases.

¹³³ See C.M. BIANCA, *Diritto civile*, III, *Il contratto*, quoted above at note [9], 250 also Bigliazzi

¹³⁴ See in this connection L. BIGLIAZZI-GERI-U. BRECCIA-F.D. BUSNELLI-U. NATOLI, *Diritto civile*, 3. *Obbligazioni e contratti*, quoted above at note [9], 553; cercare su Moscarini, non mi sembra che lo dica.

¹³⁵ Below note ... and accompanying text.

law,¹³⁶ in contrast to the rule provided in connection with contracts, which are declared binding and valid also when not specifically corresponding to a legal “type”.¹³⁷

In my opinion these are not really serious obstacles after all, however. First of all I do not see insurmountable problems in construing digital licenses of the second variety as promises to the public, waivers or a combination of the two; second, I am in good company when I say that the idea that unilateral acts are restricted by a principle of “typicity” is just a legacy of olden times,¹³⁸ which, if I may so add, has no legitimacy now that market exchange is increasingly complemented – and at times replaced – by cooperation and sharing.¹³⁹

7.4. *Unilateral Acts: Travelling Clauses, Travelling Waivers, Stability and Non-Revocability.* Indeed, reference to the conceptual and legal framework provided by unilateral acts helps to deal with a number of the typical features of the second variety of digital licensing.

Some of these may turn out to be quite obvious at this juncture; particularly so in connection with the issues we earlier looked at.¹⁴⁰ That no consideration is contemplated in exchange for a unilateral act is a truism; if it was contemplated, there would be no unilateral act but rather an exchange, also a contract. As far as the parties are concerned, we just saw how direct licensing, while incompatible with contract, may find a reliable basis in a unilateral act.

This last remark should be expanded to further note the role played in this context by “travelling clauses” and “travelling waivers”. As re-users of any given digital file or fragment obtain it under the original terms and conditions originally promulgated by licensor, they all have to abide by the same clauses of the license and may in turn benefit from the waivers made by licensor in the license. This phenomenon may give the impression that all the downstream licenses are governed by “travelling clauses” and “travelling waivers”, except that in truth what actually “travels” is not the clause or the waiver, but the digital file to which the terms and conditions are attached, so that each licensee is both obliged and benefited by terms, conditions and waivers which are the same for her as for all the other licensees.

While these remarks are – more or less obvious – corollaries and implications of the foregoing analysis, there are two points which deserve fresh attention.

1. *Stability.* What happens if the terms and conditions set by licensor **A** are complied with by licensee **B2**, who obtains the digital file or fragment through **B1**; but **B1** herself does not, for whatever reason, comply with them? Granted that the license obtained by **B1** is terminated, and may be even automatically terminated;¹⁴¹ and granted

¹³⁶ For references to this opinion – and criticism against it – see L. BIGLIAZZI-GERI-U. BRECCIA-F.D. BUSNELLI-U. NATOLI, *Diritto civile*, 3. *Obbligazioni e contratti*, quoted above at note [9], 518 f.

¹³⁷ As long as they are directed towards interests which are worth protecting by the legal system: Art. 1322 of the Italian Civil Code.

¹³⁸ See L. BIGLIAZZI-GERI-U. BRECCIA-F.D. BUSNELLI-U. NATOLI, *Diritto civile*, 3. *Obbligazioni e contratti*, quoted above at note [9], 518-519; 529; C.M. BIANCA, *Diritto civile*, III, *Il contratto*, quoted above at note [9], 260-?.

¹³⁹ See above notes [9] and accompanying text.

¹⁴⁰ See § 7.2.

¹⁴¹ Under Italian law automatic termination clauses would appear to be enforceable. For completeness sake, it should be kept in mind that there are theoretical reasons against this solution. Art. 1456 of the Italian Civil Code provides for “automatic termination” in the event a term of the contract is not complied with. However, the same provision requires that the clause the breach of which triggers termination be specifically

that **B1** is by definition an infringer a moment after termination, does this fact affect **B2**'s position? If we were talking about a license *contract*, and if **B2** accordingly were a sublicensee, the reply would be pretty straightforward: as **B2**'s acts would be deprived of their legal basis, which is the continued existence of a valid grant between **A** and **B1**, then also **B2**'s sublicense would be automatically terminated and **B2** herself would be an infringer, even though an innocent one.¹⁴²

This is not, however, what happens under digital licensing of the second variety if we see it with the lenses of unilateral acts rather than of contract in the light of Italian municipal law. In the unilateral grant perspective, each grant from **A** to **B1**, **B2**, **B3** and so on is independent from the other. This is the beauty – and the resilience – of direct licensing. If **B1** is in breach, his license is terminated and she is an infringer; but **B2**, who obtained title directly from **A**, may still continue under the umbrella of the license, that is, so long she complies for her own part with its terms and conditions.

2. *Non-Revocability*. What if the license has no final term? In the Italian legal system, it is widely believed that contractual obligations cannot be perpetual.¹⁴³ This opinion is highly questionable, as well as the corollary which is derived from it, whereby all contractual obligations are held to be necessarily and *per se* revocable.

If one assumes that a digital license of the second variety is best explained as a unilateral act rather than a contract, then it may well be that such a unilateral act turns out not to be subject to revocation. E.g. a waiver typically is not conceived as revocable, but rather as final. This is best explained by thinking about the rules applicable to so called releases, i.e. the authorizations given by rightholders, e.g. in connection with the incorporation into a movie of a given snapshot or a copyright protected sentence to be incorporated in a movie. As it was noted a long time ago,¹⁴⁴ all the movie industry would be built on

indicated; and requires the party not in default to give notice to the other party. So Art. 1456 would not help much in this connection. However the case law indicates that the parties can agree that non compliance with any term of the license is a defeating condition (*condizione risolutiva*) under Artt. 1355 ff. of the Italian Civil Code. The idea is resistible, as a condition is usually thought (and defined) as an occurrence or event, which conveys the idea that an agreement may be conditional on *external* events rather than behaviour by one of the two parties. Nevertheless the case law is rather consistent in saying that yes, the parties may agree to that: see Cass. 24 November 2003, No 17859; of 10 October 1993, No 10074; of 8 August 1990, n. 8051. A reply in the affirmative in connection with a GPL is in Landgericht München 19 May 2004 (decree), H. Welte v S. Deutschland (2004) *CRi*, 156 ff.

¹⁴² It may be of interest to note that “innocent infringers” tend to crop up when the IP protected *corpus mechanicum* may travel in a way which is out of control of the original parties of the transaction (the IP holder and the purchaser of the IP-incorporating goods): see Canada Federal Court of Appeals 4 September 2002, *Percy Schmeiser v. Monsanto Canada Inc.*, in 2002 FCA 309. [this footnote should be expanded to update the reference and to expand the analogy between digital and biotech]

¹⁴³ For a review of the literature and of the case law see P. GALLO, *Trattato del contratto*, T. 2, *Il contenuto. Gli effetti*, Utet, Torino, 2010, 1247 ff. and note 33.

¹⁴⁴ P. VERCELLONE, *Il diritto sul proprio ritratto*, Utet, Torino, 1959, 118 ff. This argument has been reiterated, in recent times, in connection with releases concerning the portraits or names of individuals, also entities

quicksand, if the release were revocable; and the legal experience of over one century tells us this is not the case.

7.5. *An Interim Assessment.* Am I saying therefore that all is well and that we have found in unilateral acts the silver bullet? Not at all, actually. Short of the situations where the judge, Italian or otherwise, finds that the relevant connecting factors point to the applicability of Italian law to any given dispute concerning a digital license of the second variety,¹⁴⁵ then the issues we have been looking at may or may not remain open, depending on the from time to time applicable law; which law may adopt either the rather convenient solutions I have been sketching out based on Italian law or alternative solutions, which may turn out to be as convenient or, on contrary, less so or even frankly inconvenient. Which it is, we will find out on the basis of the other national reports in this conference. Be it as it may, the conclusion is hardly reassuring, given that any given digital file is bound to come – through the peculiarity of direct licensing which we earlier discussed – into the hands of ever so many downstream licensees, in settings which may point to the applicability of disparate laws and therefore generate diverging outcomes depending on the rules applicable in the different jurisdictions. The same multiplicity applies to the fragments which go into a larger work: imagine that a Wikipedia item results from contributions from persons resident in Italy, Nicaragua, the United States and Ecuador, plus another handful of countries: which law is applicable?

8. *Complementarity Of Re-Uses and Ex-Ante Unpredictability: the Legal Implications.* After looking at the implications of the approach to exclusivity and to non-rivalry in production of digital resources adopted by digital licenses of the second variety, which is – as earlier indicated – the technological and social basis for the legal features we discussed in §§ 7.2 to 7.4, we should build on our findings in this connection and further explore the corollaries of the other technological determinants of digital resources: the complementarity in re-use and the *ex ante* unpredictability of the combinations these resources are amenable to.

8.1. *Complementarity In Action.* In this connection, we should first visualize the phenomenon. Imagine a value added product which combines *first* music made available under CC; *second*, a data base right released under an Open Knowledge Foundation and, *third*, is run by means of open source software run on FOSS terms. This rather simple minded, but not unrealistic, example may be further complicated in a number of ways; still it may be an interesting starting point to indicate how different digital inputs may go into a downstream product. The example shows a pretty normal occurrence: digital inputs tend to be highly complementary and in principle may easily be integrated from a technological viewpoint. In a sharing model, the ways into which these inputs may be integrated is not governed top down; rather it happens bottom up. Nobody collecting meteorological data sets is likely to imagine in advance that they may end up being fine-tuned to allow for the most accurate and adjustment prone

protected as personality rights, in the entertainment industry: see G. RESTA, *I diritti della personalità*, quoted above at note [9], at 632 f.

¹⁴⁵ Which is an issue not easy to sort out, anyhow: see [9]

forecasts to be used by teams dedicated to the maintenance of oil rigs; but this is what happens in reality.¹⁴⁶

Now let us stop for a moment to think about what happens when any given downstream product incorporates a very large number of inputs originating from a very large number of different licensors; let us also consider that most of the times the same downstream product in turn is the result of a combination of digital inputs which could not be anticipated in advance by the holders of the IP-protected assets which go into the combination. Indeed, if two digital inputs are governed by two different sets of terms and conditions, and these do not dovetail, then the admissibility of their joint re-use is called into question. More specifically, re-use is non authorized, and thus entails IP infringement, if the terms and conditions are incompatible; or is authorized on the more restrictive terms and conditions, if one set is more restrictive than the other, while not incompatible with it. Herein lies the difficulty which has been conceptualized by the literature as an issue of interoperability and may turn out to be much greater than one may imagine at first glance. Indeed, practitioners first and scholars later have noted that even licenses which broadly speaking would appear to be to a large extent reciprocally compatible do have clauses which do not perfectly dovetail. One good example of this phenomenon is the attribution clause, which entails slightly different requirements depending on the fact that CCBY or ODCBY applies.¹⁴⁷

Additional difficulties may arise: e.g. it is arguable that compliance with the two attribution clauses mentioned above requires that the credit given identifies within the downstream service or product the components respectively attributable to the two inputs incorporated in it. It is also arguable that this difficulty is enhanced rather than mitigated, when the combination specifically concerns data sets, in particular public sector information (PSI). It is not unlikely that the complementarity rate exhibited by PSI assets is even higher than that shown by music, text, audiovisual works and software. In other words it would appear that statistically it may be more likely that parts or *fragments* of PSI digital assets are combined and matched to form downstream products and services than it is the case in connection with other entities (text, music, audiovisual works, software) which are the object of digital licensing of the second variety.¹⁴⁸

We might wonder whether these issue can be dealt with on the basis of our experience in “classical” IP licensing. It is true that even there we frequently meet references to the phenomenon of “stacking”, which describes cases in which a downstream product requires authorization by two or more holders of IP.¹⁴⁹ Still, there is a huge difference between the two phenomena.

8.2. *The Interoperability Conundrum.* Let us try to clarify the interoperability conundrum using as an example PSI licensing (the picture would not be much different if we looked at another specimen of digital licensing of the second variety). The

¹⁴⁶ See Deloitte, Tech4i2, and Others, *European Commission, Information Society and Media Directorate-General, POPSIS, Pricing of Public Information Sector Study’ Summary Report*, quoted above at note [9], 16.

¹⁴⁷ Even though this is not specifically noted in the slides presented by F. MORANDO, *Ad Hoc Licenses, Dominant License Models and (the Lack of) Interoperability*, quoted above at note [9], the issue has been repeatedly discussed in the meetings of the LAPSI thematic network.

¹⁴⁸ See however L. LESSIG, *Remix*, quoted above at note [9], 51 ff.

¹⁴⁹ The debate on this phenomenon was initiated with a different terminology (referring to patents “on basic building blocks”) by R.P. MERGES, *Contracting Into Liability Rules* quoted above at note [9], at 1341 ff.

rightholder/licensor is indicated as A; it authorizes B to re-use a discrete item of PSI it holds (PSI A) into B's downstream product or service (B d.). C may in turn incorporate (B d.) in her own downstream product or service (C d.). If she does so, she is re-using (B d.) under the terms of the license between B and C; as far as (PSI A) is concerned, however, C gets a direct authorization from A, in spite of the fact that she has no contact with A itself. This last feature is clearly shown in the licensing terms under which CC licenses are used. See Art. 8, of CCBY; art. 4.8 ODbL v. 1.0. As we earlier noted, this feature is intrinsic of the mechanism adopted for the licensing of digital intangible copies, which may "travel" from their originator, A, to a subsequent downstream user, C, through the intermediate passage point of B, without A and C ever coming into reciprocal contact.¹⁵⁰ Does "classical" IP licensing prepare us for this – quite extraordinary – feature? Not at all. Rather, here we witness to a quite striking discontinuity.¹⁵¹

Until we fail to unravel this basic difference, we are at a loss to explain what is the meaning of "stacking" in digital and PSI licensing. In classic IP licensing, stacking means that under a given set of circumstances (e.g. partly overlapping patents) licensee must obtain multiple authorizations before she is enabled to manufacture and sell her product. Stacking works differently in digital and PSI licensing. Here C incorporates in (C d.) her own value added, on top of (B d.); but, as also a fragment of (PSI A) is incorporated in (B d.), she is authorized to include that digital input only if and to the extent she complies with both the terms of the authorization by B, with whom C has had dealings, and by A, with whom she has had no dealing at all. As a rule, the contact between A and C is instituted by means of digital networks; the work, the content, the fragment of the same carry with them the terms of conditions for re-use, i.e. the license, or at least reference to them; meta data take the place of dealings between A and C, even though C gets a direct license from A. In this latter perspective, "stacking" describes the phenomenon whereby the conditions for re-use of (PSI A) travel with the digital input, so that non-compliance with these latter terms by C would mean infringement of A's rights by the same C; and they are therefore added ("stacked") over the conditions for re-use agreed between C and B, which may – or may not – dovetail with the former.

We have earlier noted that a crucial feature of digital licensing of the second variety is the existence of this sort of "travelling clauses", which are a necessary incident of the non-rivalry of digital resources and may spell out the obligations which licensee has to comply with if her re-use is to be lawful rather than infringing. It should now be added be noted that reference to traveling clauses or obligations in the plural is explained by another character of digital inputs, which, as indicated, not only are non-rival in production but exhibit a strong complementarity. As C may well incorporate the inputs coming from A, A1 and so on and the inputs coming from B, B1, it is likely that she is bound to simultaneous compliance with different sets of "travelling clauses".

Should we think that this elementary situation is not intricate enough, we can complicate it as much as we like just by turning our attention to licensor. Let us assume that licensor "waives" her rights in some regard, as it may be when the licensed content

¹⁵⁰ See above, § 7.2.

¹⁵¹ Except when we take into consideration licensing of entities which may be self-replicating, as software and DNA-information, which may in this connection be considered as a bridge between "classical" and PSI licensing.

incorporates data base rights. A similar occurrence has been noted where licensor A may wish to insert a viral share-alike feature in its licensed PSI, but at the same time she waives it for certain classes of derivative content. Here the question is: does the waiver “travel” further downstream when licensee incorporates A’s in her own product or service (B d.)? In accordance with the previous analysis, the reply should be in the affirmative. Therefore we also have “travelling waivers” making the landscape of digital licensing of the second variety more diverse. The landscape gets even more complicated, when we think that A may wish that also B applies the same waiver, to avoid that the re-use of its initial contribution is blocked downstream, either by data base rights or by the viral feature. If this wish takes the form of an obligation on part of B to adopt the same waiver, a “travelling waiver” (from licensor) is then combined with a “travelling obligation to waive” (on licensee as a candidate to become a licensor).

Now we may come back to the question whether classic IP licensing prepare us to any of this. The reply is clearly in the negative. Indeed, digital licensing of the second variety is based on authorizations structured in an automated way in such a manner as to enable licensor to directly authorize re-user even without having a direct dealing with her.

Chains of authorizations are not unknown to classic IP licensing; but there they take the starkly different route of sublicenses, whereby licensor A enables B not only to exploit directly the IP but also to authorize C (and possibly C1, C2 etc.) to exploit the same. Thus the question here is not one of “travelling” – and potentially mutually incompatible – obligations; but of derivative compliance.¹⁵² B must make sure that she binds C (and, if applicable, C1, C2 etc.) to the same obligations as she has undertaken towards A; should C fail to comply, both C and B would simultaneously be infringing A’s IP rights (and B might have recourse against C to be held harmless of the ensuing loss).

To make a long story short: “classical” sublicensing is a one-way route; digital licensing of the second variety in connection with downstream products which incorporate complementary digital inputs is a maze of crisscrossing avenues. This is explained by the fact that sublicensor sublicenses the same IP as licensor licenses to sublicensor; whereas digital licensing of the second variety concerns multiple digital inputs, which are multiplied as they are re-used and carry with them the travelling clauses and obligations which concern each of them.

8.3. *Complementarity Of Re-Uses and the Design Of the Rules On Interoperability.* What is then the impact of legal rules on this conundrum? We earlier remarked that legal rules do have an impact on the governance of the legal implications of non-rivalry of digital resources, except that the multiplicity of legal systems called to deal with them may lead to diverging outcomes and to a very large risk of legal uncertainty, which cannot be remedied as long as we stick to the idea that applicable rules are bound to be municipal and selected in accordance with traditional conflict of laws principles. Here the difficulties are created by the complementarity and *ex ante* unpredictability of the combination of digital inputs and accordingly take a different shape.

¹⁵² As noted earlier, a situation similar to the one taking place in digital licensing of the second variety may occur when licensing concerns derivative patents, whereby C, in order to obtain a license from B, needs to obtain authorization both by B and from A, whose upstream patent is included in B’s derivative patent. This is a rare occurrence, though.

Indeed, the goal of facilitating the possibility of the creation of downstream products and services aggregating different digital inputs may best be approximated by the adoption of rules favoring the standardization and interoperability of licensing terms. In this connection standardization promotes the adoption of uniform sets of rules applicable to the different digital inputs which may, by way of decentralized decisions by re-users, go into the creation of a downstream product or service. Standardization by definition avoids the compatibility problems earlier envisaged. Indeed, if C incorporates digital inputs coming from A and B and these carry with them “travelling” clauses and waivers belonging to a uniform set of licensing terms and conditions, no issue of simultaneous compliance may by definition arise.

A comparable outcome may be reached by a different route, though. Even terms and conditions which are not uniform may be interoperable; interoperability means that, while terms and conditions are not identical, they are not incompatible.¹⁵³

In principle, devising and adopting standardized or interoperable sets of licensing terms is a matter which is best left into the hands of private players. Sovereigns may contribute to the task at the margin, by making the chances of success of private ordering greater. This is done *on the positive side* by fostering and promoting cooperation among stakeholders and assisting in the emergence of communities engaged in the creation of a sort of *lex communitaria*, which might be seen as a present day parallel to the emergence of the *lex mercatoria* which came to prevail in the later Middle Ages when municipalities and cross-border trade flourished. The components of this body of law may be gleaned, considering that legal systems should favor processes of *delocalization*, whereby the licensor/licensee relationship should to the extent possible be governed by rules which are not nationally rooted but rely on the practices and perceptions of the community to which re-users belong. It should be underlined that this idea does not link back to ideas of independence of the cyberspace from ancient regulators,¹⁵⁴ which obtained some popularity a few decades ago but has in the meantime proved simplistic and inappropriate in view of the multiple interactions between virtual and brick-and-mortar worlds. Rather the idea should link to successful experiments in self-regulation, where some experiences of homogeneous communities like commodities markets, stock exchanges and advertising come to mind, and the more recent experiment with the speedy and well received dispute resolution mechanism concerning domain names¹⁵⁵ would appear to provide a valuable template and starting point.

The point here is not that sovereigns should keep their hands off; rather, that they should intervene by fostering the creation and the deployment of rules which are conducive to the cooperation between members of a community in order to optimize the benefits obtained by products and services which show a high rate of positive externalities. This new role may be played in the designing of an appropriate dispute resolution mechanism, to begin with; and might extend to the creation of “black” or

¹⁵³ See in this connection J. PALFREY-U. GASSER, *Interop*, above at note [°], [°]. [also go into formats and asset lists]

¹⁵⁴ As proposed by D.R. JOHNSON-D. POST, *Law and Borders: The Rise of Law in Cyberspace*, in 48 *Stanford L. Rev.*, 1996, 1367 ff.; see also G. TEUBNER, “Global Bukovina”: *Legal Pluralism in the World Society*, in (G. Teubner ed.), *Global Law Without a State*, Dartmouth Publishing Co., Aldershot, Brookfield, U.S.A., Singapore, Sidney, 1997, 16 ff.

¹⁵⁵ On the UDPR see F.M. ABBOTT, T. COTTIER, F. GURRY, *International Intellectual Property in an Integrated World Economy*, Wolters Kluwer, Austin, Boston, 2007, 394 ff.

(better) “gray lists”, indicating which license clauses may hinder or restrict interoperability.¹⁵⁶

There is also a *negative side* to sovereigns’ task in this connection. Legal systems should to the extent possible refrain by adopting top-down national templates for licensing terms and conditions. This is a temptation which has unfortunately proved almost irresistible in the field of PSI, which is of crucial importance for the growth of value added digital products and services as it provides veritable minefields of raw data crying to be incorporated downstream.

Nominally, the rationale for adopting national rules, rooted in the specifics of a given legal system, links back to the fact that the relevant PSI was created and organized by a given public sector public sector information holding entity (PSIH), which is based in a specific jurisdiction, so that it would at first blush appear that it stands to reason that the PSIH acquires rights and undertakes obligations on the basis of its own legal system also when the dissemination of PSI is concerned. However, this argument does not stand to scrutiny when one considers that even national sovereigns have an interest in fostering cooperation in the exploitation of a non-rival resource showing a high degree of complementarity, without regard to the fact that the candidate digital input is foreign or national; and one keeps in mind that national licenses do not mix easily.¹⁵⁷ Moreover, in the EU perspective the positive obligation of Member States to contribute to the creation of the internal market should play an important role. In any event the fact that a given data set has a given national “entry point”, e.g. data collected by a British PSIH, should not unduly influence the rules by which it is governed at some later stage of its – in all likelihood quite roundabout – life cycle, any more than any given car first put into circulation in the UK should be governed by British law even when it travels abroad.

9. *Digital Licensing and the Quest For Global Rules.* In a nutshell: I argued that the most relevant legal issues to be faced by digital licenses of the second variety are best understood as the implications of the approach adopted by them towards exclusivity and non-rivalry in production on the one side and of the complementarity in re-use of the digital inputs made available through them on the other side.

We also have seen (in § 7) that digital licenses of the second variety are unilateral acts, rather than contracts; that the relationship between the one licensor and the many licensees does not amount to a sublicense but to a direct license and that the license itself may concern fragments of the digital resource. We have seen how these features, while linking back to the social basis of on line cooperation and specifically to sharing and peer production (§ 3), turn out to be the – unavoidable? – outcome of the technological determinants of this mode of creativity. Indeed, non-rival digital resources automatically coming with the terms and conditions of their re-use attached

¹⁵⁶ The task is not an easy one. For instance, the Commission Decisions 2011/833/EU of 12 December 2011 on the reuse of Commission information, in *OJ* 14 December 2011, L 330/39, falls short of the “wish list” advocated here on most accounts.

¹⁵⁷ For references in demonstrating this – quite self-evident – point see my *Public Sector Information as Open Data*, quoted above at note [i], § 3. The point should also be added that interoperability requires that automatically reprocessable metadata are built in licenses, including their semantic representation in accordance with the Linked Data approach, which is a task which probably would be hardly manageable by the legislators of 28 Member States and is best undertaken by private ordering having a global dimension.

would not be capable of pulling the trigger of contract, while they are perfectly able to do so with the trigger of unilateral acts (§ 7.3). These legal artifacts, while comparatively unexplored in societies building on price-based market exchanges, have a magic of their own; they also happen here to be able to contribute to the stability and non-revocability of online transactions (§ 7.4), as it should be if we do not want our digital castles to be built on quicksand.

Also the other dominant technological features of the digital licensing of the second variety – complementarity in re-use and *ex ante* unpredictability of the combinations of the digital resources – account for the issues of standardization and interoperability of terms and conditions (§ 8).

Legal rules applicable to digital licensing of the second variety ultimately concern on line cooperation. As the net is everywhere and nowhere in particular, traditional conflict of laws analysis is at a loss to identify robust connecting factors (§ 7.5 and 8.1). If contributions from one hundred countries go into a Wikipedia article, how on earth can we find that the closest connection is with one specific contribution to the exclusion of all others?

Therefore, while the analysis of digital licenses of the second variety has been conducted with the lenses of Italian law, it is submitted that any approach rooted in municipal law and in the process of choice among multiple municipal laws is doomed in connection with on line cooperation. In connection with market exchanges and contracts, choice of laws may still work: after all there is a place where the (albeit digital) goods or services are delivered or supplied; also payments (even though digital), end up into an account which is likely to be linked to some place of residence. For unilateral acts this is not necessarily true: on line cooperation as a rule entails that thousands “small grains” of contribution come from everywhere to form a larger unit which in turn is accessible from everywhere; while in the past we might have had the illusion that the digital resource resulting from the manifold contributions still was located on a physical resource – the “server” -, with cloud computing we lost even that illusion.

The lesson of this exploration therefore is quite simple, if extraordinary: while contracts, even on line contracts, may still be municipal, unilateral acts cannot be but global. It is at this junction where comparative law must plan for its demise and start to look at global law as its next mission.¹⁵⁸

A similar lesson comes also from the exploration of the corollaries of standardization and interoperability (§ 8). Here the task of ancient sovereigns has again a global dimension: their intervention should be confined to supporting and fostering the emergence of self-regulation of private stakeholders *via* private ordering; and refrain from meddling.

It is submitted that ancient sovereigns will never do that, unless they are forced to do so.

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¹⁵⁸ The issue of integrating the global dimension of unilateral acts with the municipal character of the IPRs which are the subject matter of digital licenses of the second variety is discussed in [°].

