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***Self-help systems: good substitutes for copyright
or new barriers to competition?***

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Information and communication technologies (ICTs) are often viewed in the cultural industries as being conducive to copyright infringements. By enabling the reproduction of protected works, they give rise to free riding problems. Non-rivalry in the consumption of cultural goods and the difficulty of shutting out copiers has been an issue since the development of analogue recording technologies (Adelstein and Peretz, 1985). But because digital technologies make it possible to copy material with no loss of quality and to distribute it at very low marginal costs, they take the phenomenon to new heights. There are various forms of copying: from individuals copying files on-line and burning CDs (for their own personal use) to industrial-scale piracy (for commercial gain). The “dematerialization” (digitization) of cultural goods makes it very hard for suppliers to prevent non-paying users from gaining access to original artistic works. Online sharing of cultural goods centres mainly on free—and for the most part unauthorized—peer-to-peer networks.

Free riding may well render copyright impossible to apply in the digital economy: Barlow (1996) is quick to brand it a “relic” of the pre-digital age. But the absence of copyright would be a loss to artists and producers alike. How else can they find the sizeable amounts of investment needed to finance cultural content? A number of economic solutions already offer alternative ways for producers to cover their fixed costs without the benefits of copyright (Shapiro and Varian, 1998). These tend to be either commercial (indirect appropriability through bundling, cross-subsidies, tied sales, etc.) or technological (with digital technologies no longer poisoning copyright but serving as a remedy to unauthorized sharing and piracy).

This paper aims to go beyond the simplistic poison/remedy tandem. On the one hand, it underscores the limits of the “contractual” paradigm dominating a share of the digital economy debate. On the other, it shows how producers can use these “cure-all technologies” to erect new entry barriers, a solution that would, as it happens, run counter to the interests of the artists and the users.

1. Protection technology-based contracts are no wholesale substitute for copyright

1.1 The alleged benefits of the contract

According to economic literature, there is some arbitration between copyright and contracts. Copyright involves sacrificing a share of contractual freedom. It imposes restrictions not only on publishers and producers, but also on all parties concerned in the future. A contract freely entered into, on the other hand, affects none but the contracting parties. With the development of ICTs, a number of economists and legal experts have been challenging the usefulness of the constraints that copyright brings to bear on

contracts (compulsory clauses, exceptions, etc.). ICTs lead to a considerable reduction in transaction costs, which should in turn generate an increase in contract-based commerce.

Contracts may eventually replace copyright on digital networks (Dommering, 1995; Friedman, 1996). Suppliers would negotiate directly with the users and nobody would have to put up with copyright restrictions. By acting as exclusionary barriers to free riding, technological defence devices would allow content to be protected through privately-formed contracts rather than through copyright.

Protection technologies are now described as "self-help systems" (Dam, 1999). Just as an individual creating a physical object might seek to protect his or her new property by placing it in a safe, for example, cultural goods producers use a software system to defend their property against attempts at unauthorized appropriation.

Let us assume that self-help systems prove an effective means of protection, i.e. impenetrable at each and every stage of the commercial chain. A contract-based regime would then offer a good many advantages. First, decentralized electronic contract management provides a high degree of control over usage, with self-reporting—automatic forwarding of data to producers every time their content is accessed on a digital network—enabling electronic traceability. Next, there is the potential for greater market value enhancement: content providers can set a different price per category of user and use, and can maximize their revenues through price discrimination (Meurer, 1997, 1998; Bell, 1998). Finally, there is room for less costly and more competitive bargaining. Both sides can settle a contract quickly with the help of standardized contractual instruments. Contracts, being non-predetermined and freely negotiated, are more flexible than copyright in the digital economy.

1.2 Information asymmetries and a shortage of trust

There are a number of factors that serve to bring this optimistic picture into perspective. For a start, the contract is not quite as flexible as this new paradigm might like to make out. Online contracts basically involve subscribing to terms and conditions predefined by the content provider (Merges, 1997; Lemley, 1995). The "click to accept" buttons usually figuring in software (shrinkwrap licences) or on the Internet may well resemble a bilateral contract. But such contracts actually boil down to an opening page, offering users an opportunity to peruse the terms and conditions and, if they agree, to hit the "accept" button. The only freedom of contract they have is to accept or refuse.

Furthermore, content is used by thousands of intermediary users around the world for an enormous variety of purposes that often call for specific bargaining and contracts (Merges, 1996). The absence of a universal registry and the risk of breaks in the chain of transfer are just two of the factors that can be conducive to the spread of opportunist behaviour. Despite the fact that data protection and traceability technologies are, without a shadow of a doubt, potentially powerful, they can only protect the content traded if there is a continuous economic link between the seller and successive users throughout the value

chain. Once decrypted, the content escapes the control and protection of its producer (Merges, 1997).ⁱ

Parties are not always negotiating with the same partners; and users and providers alike are confronted by information-related problems: acts of fraud, ignorance or negligence. One party may, intentionally or otherwise, circulate copies of works containing false information on the identity of the original producer. Introducing contract security can serve little purpose given the extent of information asymmetry. ICTs help facilitate the bargaining, but the market offers providers with no safeguards whatsoever against the “moral hazard” risk. For even if users agree to the terms and conditions, how can providers ensure that they are keeping to their side of the bargain or check how the content is actually being used? They can, of course, seek to acquire a self-help system. But the effectiveness of that solution can be undermined by its cost, its vulnerability or a refusal on the part of users to adhere to such a means of surveillance.

We share the view of Merges (1997) that ICTs do not reduce transaction costs far enough to allow for the emergence of a world where contracts can outweigh regulations. ICTs may well lead to lower search costs (building databases of producers, works, etc.), but they have less of an impact with respect to other costs: bargaining (e.g. specific contractual clauses), *ex-post* (supervision of contractual commitments, renegotiation, etc.).

Digital networks—given the speed and omnipresence of multiple transactions, not to mention the anonymity and heterogeneity of contracting parties—are high-risk environments governed by what Orléans (1994) calls “the incompleteness of pure market logic”. Many contracting parties, therefore, turn to third parties for arbitration and underwriting.ⁱⁱ The greater the asymmetries, the more important it may be to have some form of institutional regulation.

2 – New entry barriers in the cultural industries

In theory, digital technologies can be regarded as an alternative to copyright for protecting content. In practice, the majors companies are currently using them to reinforce their copyrights rather than as a replacement. Either way, whether ICTs serve to reinforce copyright or replace it with contract law, they give rise to issues of standards and compatibility.

Thus far, producers have been competing with one another by erecting entry barriers at distribution level (Farchy, 1999). Content protection technologies represent a new competitive weapon that could boost the market power of the dominant producers and publishers.

2.1. An endless technology race

The more watertight the self-help system the greater the guarantee that providers can protect their content against copying and minimize the value lost to unauthorized users. In

some cases—when faced with the risk of plagiarism, for instance—these systems absolutely have to provide an infallible means of authenticating rights to the use of artistic works.ⁱⁱⁱ As we are regularly reminded in the news, however, protection systems are far from invulnerable.

Producing technologies may take time, skills and abilities and material and human investment. But they can be *assimilated* at low cost by anyone who is computer-literate; all the more so given the considerable synergies that they foster among actors belonging to Internet forums. With respect to protection systems, content providers and copiers thus find themselves engaged in a technology race. As Dam (1999: 402) points out: “[...] *one can view the copier as the attacker, with the content provider responding to copying by using “defensive” self-help systems. Then offensive techniques will arise to overcome the defenses to copying (or to alterations) not authorized by the content provider, and so on ad infinitum.*” The outcome of that race is unclear.

Copiers are seeking to make some form of gain, be it material (resale of pirated content or circumventing technology) or symbolic.^{iv} They can therefore be involved in a race in which they are competing against each other via copiers’ coalitions or clubs, where some are pirating the original content and others are purchasing it.

From the content producers’ point of view, the technology needs to be sufficiently well developed to enable them to make returns on their investment. They do not mind losing some stages of the race if they emerge as the overall winners—with the help of the other means they have of capitalizing on their content. As for those distributing content via the Internet, the technology needs to be infallible when it comes to ensuring that rights to use that content are authenticated and respected. They have to win each and every leg of the technology race, for defeat will put them out of the running. So, if they are legally bound to a strict liability regime, website hosting companies and Internet service providers can ill afford to lose because any victory on the part of hackers will leave them with a dead loss.

Experiences with defensive self-help systems are many and varied. Given the diversity of operators, it is highly unlikely that a single standard can be enforced. What is more, technologies that are viable for one type of content are not necessarily universally applicable and will serve to generate distinct installed bases by significantly rising switching costs. In the event of head-on competition, there may be a number of different standards hinging on content type or the extent of oligopoly in the marketplace. The absence of a single standard raises two questions. First, does a diversity of competing technologies not serve merely to undermine efforts to protect content and manage copyright? Second, is there any strategic manoeuvring involved in the proliferation of incompatible systems?

2.2 Compatibility is a must

The coexistence of competing self-help system projects is akin to that of competing standards. One of the key issues with respect to standardization is the matter of compatibility. As a rule, the market has two alternatives for fostering inter-standard

compatibility: either the actors voluntarily seek consensus and define common standards through standard-setting committees; or individual actors enforce their own standards.^v In every event, IT firms often have to arrive at an agreement when launching new products, given the highly complementary nature of content, data transmission networks and storage media.

Having a diversity of competing systems seems to be unhealthy from the point of view of content providers and users alike, for it incurs information costs as well as multiple adoption costs. Technical conflicts are likely to result from the same content being protected by different systems at different stages in the value chain. Users would have to "subscribe" to a number of different security and decryption systems, and to switch to others in line with developments in the technology race between producers and copiers. What is more, there is the risk of creating "angry orphans" (David, 1987, 1995): copyright owners or content providers having adopted a system that is subsequently abandoned due to obsolescence or if the developer goes out of business. From the intermediary users' point of view, the coexistence of different authentication and protection systems generates inefficiencies stemming from information-gathering costs. Furthermore, interoperability must extend beyond national frontiers. If every national grouping of copyright owners independently adopts its own standard, it will give rise to the risks of incompatibility and non-interconnectability, which is bound to create problems given the instantly global scale of exploiting works via the Internet (Hoeren, 1995).

Competition between technologies may have short-term advantages, not least because it stimulates innovation. But a fundamental precondition of its longer-term efficiency is that systems developed in parallel be interoperable.^{vi} Some projects—the EC's Copyright in Transmitted Electronic Documents (CITED) project, for instance—provide solutions geared to interoperability. Providers seeking to protect content must be able to shift it from one system to another without incurring significant switching costs: the cost of changing format as well as opportunity costs. What if the technology were to prove a failure (due to an insufficient installed base, for example)? Would the content still be protected when switched to another?

Minimizing switching costs would call for the adoption of common standards with respect to identifiers and metadata. An identifier code has to be recognized by every system, irrespective of its traceability and anti-copying techniques. This corresponds to the gateway technology concept within the realm of economics of compatibility and standards.^{vii} It is a matter of having an alternative to universal standards, one that provides for *ex post* compatibility. These gateway technologies help foster an increase in demand by producing network effects between previously incompatible systems.

Yet *de facto* incompatibility and non-interoperability can also be seen as an attempt to lock in the installed base by the developers. Network effects lead to efforts to secure a market lock-in: if the competing technologies are incompatible, abandoning a network can result in considerable switching costs and, hence, force the system owner into *ex ante* calculation. The installed base of each firm represents a strategic entry barrier (Cohen, 1996). Competition can therefore prove harmful to content producers, especially when the

guiding principles of a network such as the Internet facilitate a basic minimum of compatibility and interoperability (Barrow, 1996).

2.3 Strategic goals of the producers

The installation of defensive self-help systems goes hand-in-hand with cooperation between the content providers benefiting from complementary potentialities. Indeed, the latter seek to acquire “*additional strategic means geared to gaining or re-establishing competitive advantage*” (Monateri and Ruffieux, 1996, p.102). Meanwhile, however, such “cooperative” developments give rise to both latent and open conflict between providers seeking to impose their own standards. The development and installation of self-help systems is actually very costly in terms of investment (research, standardization, etc.), risky alliances and high-speed obsolescence. Not every actor can afford such investments in isolation. Large organizations seem to be the only ones capable of mustering the necessary competencies and financial resources to keep on developing and upgrading these systems. The levels of investment required represent an entry barrier that runs the risk of smaller producers being excluded. Producers with less efficient systems cannot ensure that their rights will be respected as thoroughly as those that benefit from a system securing higher appropriability. Independent producers and publishers can, of course, approach specialized technology suppliers, but they are then subject to information asymmetries: how can the degree of effort actually made by service providers be assessed with a view to improving their systems’ performance?^{viii}

The coexistence of a variety of different protection standards represents an additional factor of competition. In answer to the second of the two questions posed earlier, the cultural industry majors have been deliberately creating and promoting incompatible systems in an effort to secure a dominant position as market intermediaries. Creators would prefer to go through them because they provide a guarantee of higher earnings.

The process of competition/cooperation between dominant firms is illustrated by the music industry’s Secure Digital Music Initiative (SDMI) consortium. SDMI was set up in 1998 in order to develop technological specifications for online music so as to counter MP3 and create an anti-piracy protection standard. So it amounted to a standard-setting committee whose aim, according to those taking part, was not to impose a single standard from above but to negotiate common formats with a view to standard interoperability. Rather than produce *ex ante* compatibility standards that ran the risk of rapidly becoming obsolete, SDMI wanted to create gateway technologies for *ex post* compatibility.

Yet beneath the surface of this ambitious project, competition has continued to rage between the majors. It has mainly served as an arena bringing the majors into contact with the large IT industry players. The majors were seeking alliances so that each could develop its own online distribution system. Competition between the majors has therefore continued via efforts to seek the best possible appropriability-oriented technology. The most effective standard within the realm of enclosure (establishing *technological barriers* and preventing them from being circumvented) secures improved appropriability and a dominant position in the field of online music.

In May 1999, Microsoft (one of the leading promoters of the SDMI) put forward its own system with a view to cornering the downloadable music systems market. Its MS Audio 4.0 format, however, proved far from compatible with the standard SDMI format and, unfortunately for Microsoft, was quickly circumvented by software circulating on the Internet. The same month, Universal announced an alliance external to the SDMI consortium with InterTrust (Digibox). And Universal and BMG (the GetMusic joint venture) entered into an alliance ATT and Matsushita: the two majors supply the content, while ATT develops online distribution and billing systems and Matsushita focuses on an anti-copying system. This coalition spurred Sony into joining forces with Microsoft, also in May 1999, with a view to distributing content using Windows Media 4.0.

These opportunistic alliances^{ix} account for the delays in the SDMI schedule and the discontent of producers of equipment for downloading and listening to music. Indeed, competing services have been developed to enable the illegal trading of music files. These have worked fully to the advantage of MP3 technology. The Napster or Gnutella systems, for instance, have encroached upon the potential client base of firms such as Liquid Audio, AudioSoft or RealNetworks. The SDMI project was well and truly scuppered by the failure of its anti-piracy solutions.^x

More recently, in 2001, this interplay of alliances and competing standards was further stimulated by the appearance of two rivalling coalitions in the music industry: MusicNet, associating AOL-Time-Warner, BMG-Napster and EMI with RealNetworks; and PressPlay, a joint venture launched by Vivendi Universal-MP3.com, Sony, Yahoo and MSN. Both aim to distribute music on-line via a combination of subscriptions and security processes. Each is developing its own protection system. The problem is that access to the works on each site is restricted to the content produced by the majors taking part in the respective projects, while the consumer chooses neither the companies nor self-help systems, but the artists and musical genres. A similar phenomenon exists in the film industry: the majors are currently seeking a means of extending their business activities to digital networks. In the final analysis, the development of electronic commerce is hindered not so much by copyright as by the strategic manoeuvring of majors, which may end up producing non-interoperable and incompatible technologies.

Conclusion

Purely technological solutions seem ill suited to resolving free riding problems. Maintaining rules and institutions appears to be a must. Self-help systems are not neutral. They become competitive arms that are not within reach of every producer. Copyright may well be open to criticism, but it stands on more equitable grounds: nobody is excluded from this "invisible technology" whose adaptation costs (costs of implementation and regulation) are borne by the community at large. What is more, unlike strictly technological solutions, copyright guarantees a certain number of exceptions for users. Indeed, their "rights"—as defined by those exemptions—must be safeguarded in order to

limit the scope of overprotection by technology (Cohen, 2000); self-help systems can, for instance, extend to content that is no longer protected by copyright or that falls within the realm of copyright exceptions. The US Digital Millennium Copyright Act of 1998 and the EU copyright directive adopted in May 2001 could represent a genuine threat to users (Rochelandet, 2002a). In providing legal protection for self-help systems, these two laws actually place major restrictions on the users' "rights".

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ⁱ More specifically, Merges (1997) raises the issue of legal ties between the provider and the various transferees throughout the property transfer chain. If party A enters into a contract with party B and B does likewise with party C, and if A wishes to take legal action against C for a breach of the contract agreed with B, then some tie or another must exist between A and C at some point in the chain. Any legal action will be focused on party B. But a host of problems arises if B is representing a number of other parties, some of whom are not subject to A's jurisdiction while others are insolvent. The fact is that under a strictly contract-based regime, A cannot pursue C for breach of contract because they have not directly entered into an agreement with each other. Merges (1997) argues that application of contractual clauses hinges on an unbroken legal tie imposing obligations on the initial contracting party and all successive users throughout the commercial chain.

ⁱⁱ Orléans (1994) points to three alternatives: oath, reputation and contracts. The first two are somewhat vague when it comes to digital networks. The oath is ill suited to an information society that lacks any meaningful means of monitoring whether individuals are adhering to or complying with a given moral prescription. As regards reputation, Friedman (1996) and others may believe the electronic signature system to be an adequate means of creating the necessary conditions for it to have an influence, but the extent of that influence remains hard to gauge. And unless there are third parties, the contract is just as problematic.

ⁱⁱⁱ Dam (1999) cites the example of photography in journalism: "*some integrity uses (say in photojournalism) require time stamps to determine when the digital original was taken; where the photograph is sufficiently controversial that its integrity is open to question, the time stamp needs to be robust against hostile attack*" (p.402).

^{iv} A repressive institutional framework can increase the chances of providers marking a victory by increasing the average cost of copying for "commercial" copiers. Copiers can be fined if their actions are geared to making financial gains, or face other kinds of penalties when their aims are non-financial.

^v Another solution, of course, would be *de jure* standard-setting on the part of the State.

^{vi} "*It is generally recognised that without a high degree of interoperability between the various proposed schemes for copyright control (Cryptolopes, COPYSMART, etc.) the market will remain fragmented and costs will be too high for an acceptable service (except perhaps in some specialist, high value areas).*" (LITC, 1996, p.45)

^{vii} See Greenstein (1997), Choi (1996), Farrell and Saloner (1992), David and Bunn (1988). David and Bunn (1988, p.170) argue that "*some means (a device, a convention) for effectuating technical connections (technical compatibility) between distinct production subsystems are required in order for them to be utilized in conjunction, within a larger integrated production system*". Farrell and Saloner (1992) single out a number of gateway types that differ according to whether the owner can benefit, unilaterally or otherwise, from additional network externalities.

^{viii} There may be a number of competing firms in the market. A producer whose earnings are lower than those of its competitors is not always capable of distinguishing its share of responsibility in a failure (e.g. flawed editorial approach) from the influence of inefficiency in the system adopted.

^{ix} The firms in question work together in standard-setting committees. When each has competencies that the others lack, they cooperate fully in the process. The risk of opportunistic coalitions comes to the fore when their areas of competency overlap. In such cases, the nature of their cooperation in the upstream reaches of the market becomes technical—geared to market creation—and strategic—geared to dominating the market (Ledortz and Lequeux, 1999).

^x SDMI set a challenge in autumn 2000 by offering a \$10,000 reward to anybody who could unpick the electronic watermarking incorporated into music files without any loss of sound quality. Alarmed at how quickly a number of research teams managed to achieve this, the consortium sought to protect the security of its protection system by threatening to sue a university professor and his team if they went ahead with their aim of publishing their findings.