Digital Rights Management (DRM) Standards Inc.: Rethinking Cyberspace Regulative Epistemology[1]

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DIGITAL RIGHTS MANAGEMENT (DRM) STANDARDS INC.

ABSTRACT

This paper argues that normative commands designed through software in the form of technological standards should be analogized to legal rules instead of legal standards. It does so from a critical viewpoint of the traditional body of research regarding the distinction and choice between rules and standards in the legal process. As a case study, it examines the rapidly emerging Digital Rights Management (DRM) standardized software technology for network environments.

This paper's analysis departs from Louis Kaplow's well established model, according to which the central distinction between rules and standards is the extent to which efforts to give content to the law are undertaken before (ex ante) or after (ex post) individuals act.[3] *Arguably, for network environments, the argument for technological standard settings shows that what look like standards that regulate substance are really covert rules. Nonetheless, this paradigmatic shift is also met by an opposite regulative constraint in the face of the decreasing ability of centralized institutions to regulate network environments through software technology, at large. Thus, this covert rule-making activity, optimally associated with centralized institutions' regulation must now suggest an adapted checked and balanced regulative framework. Notwithstanding the importance of this latter constitutional observation, this paper wishes to focus on the epistemological shift technological standardization is going through. Ultimately, for software regulation in network environments, this paper recommends adapting it to a rule oriented approach instead.*

[3] Louis Kaplow, Rules Versus Standards: An Economic Analysis, Dule L. J. 557 (1992).

I.
INTRODUCTION

Network environments advance software-made regulation that in many cases carries normative content. An example is the case of Digital Rights Management (DRM)-like technology.[4] In regulation theory, such software-made regulation is also indoctrinated as standard setting.[5] In the physical world, standard setting decentralizes decision making and delegates more decision making power to sublevels of the legal system.[6] On its face, as commonly upheld by policy makers and commentators, this trend is also assumed in network environments such as the Internet.[7] Albeit overly broad, so as to

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[4] See,discussion at § II & III.D, infra.

[5] See, C. F. Cargill, *Open systems standardization: A business approach* (Prentice Hall PTR, 1997), pp. 26-29, 137-138; J. R. Reindenberg, *Lex Informatica*: *The Formulation of Information Policy Rules through Technology*, 76 Tex. L. Rev. 553, pp. 570-572 [Hereinafter, "Lex informatica"]; J. R. Reindenberg, *Governing Networks and Rule-Making in Cyberspace*, 45 Emory L.J. 911, pp. 918, 927-928 [hereinafter, "Governing networks"].

[6] See, e.g., Isaac Ehrlich & Richard A. Posner, An Economic Analysis of Legal Rulemaking, 3 J. Legal Stud. 257 (1974), p. 267.

[7] For the present U.S. official policy, see, William J. Clinton & Albert Gore Jr., *A Framework for Global Electronic Commerce* (1997), developed by the White House with the involvement of more than a dozen federal agencies, available at <http://www.ecommerce.gov/framewrk.htm> (last visited 15 May 2003) (broadly suggesting, "The United States believes that the marketplace, not governments, should determine technical standards and other mechanisms for interoperability"), § 9, p. 20 [Hereinafter, "The Report"]; see, also, United States Dep't of Commerce, *The Emerging Digital Economy II*, §1 Secretariat on Electronic Commerce, U.S. Department of Commerce, April 15, 1998, at <http://www.ecommerce.gov/ede/part1.html> (last visited 15 May 2003); See also, the Telecommunications Act of 1996, broadly suggesting that it is the policy of the United States "to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State regulation," and the FCC has a

refer to different types of standards alike, the formal technological standardization policy in the U.S. takes a strong position against government centralized standard setting.[8] Rather, it is said there, decentralized industry groups (*gray*) and in some cases also the private sector (*de facto*) standard setters should set technological standards for the Internet.[9]

Arguably, the underlying assumption suggesting that software-made regulation is and should be associated with standard setting is to some degree illusory. Due to few technological and commercial developments, software-made regulation, such as the Content Scramble System (CSS) anti-copying protection used for encrypted DVD

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responsibility to implement that statute. See, *Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56*, to be codified at *47 U.S.C. §§ 151* et. seq;

For the theoretical perspective, see, e.g., M. A. Lemley, *Standardizing Government Standard-Setting Policy for Electronic Commerce*, supra note 98 (criticizing the U.S. government for dictating an encryption standardization policy), p. 478; L. Lessig, *Code and Other Laws of Cyberspace*, (basic books, 1999), pp. 35-36; J. R. Reindenberg, *Lex Informatica*, pp. 570-572, pp. 589-592; E. L. Rubin, *Computer Languages as Networks and Power Structures: Governing the Development of XML*, 53 SMU L. Rev., 1475 (2000) (concluding that at present, the government does not want to undertake the task, private groups do not want government intrusion, and no one thinks government will develop the optimal standards), p. 1455.

[8] See, ibid, the Report, ("The United States considers it unwise and unnecessary for governments to mandate standards for electronic commerce, id; The Report also refers to governmental centralized control over standards development as a "potential area ... of problematic regulation"), id.

[9] Ibid, ("We urge industry driven multilateral fora to consider technical standards in this area", id. Nevertheless, the Report upholds that "in some cases, multiple standards will compete for marketplace acceptance", id. In support of private sector intervention, the First Annual Report of the U.S. government's Working Group on Electronic Commerce published a resolution pushed at the Global Standards Conference in 1997, in which government participants agreed to let the private sector lead in standard-setting. See, the U.S. Gov't Working Group on Electronic Commerce, *First Annual Report IV* (Nov. 1998), available at <http://www.doc.gov/ecommerce/E-comm.pdf> (last visited 15 May 2003).

technology or other DRM technologies, originally associated with standard setting, have more characteristics of rules than of standards.

Such a conclusion also has immediate institutional implications. In regulation theory, rule making is typically considered a regulative activity best provided by centralized institutions, namely government regulation. In network environments such as the Internet, though, centralized regulation seems to be inefficient in keeping pace with the dynamic commercialized nature of the net.[10]

In essence, two contradicting developments seem to be occurring in parallel, creating a regulative anomaly. On the one hand, cyberspace's software-made regulation that regulates digital content is more characterized like rules instead of standards, thus conceptually implying institutional centralization. On the other hand, decentralized regulation, better associated with standard setting, is increasingly gaining institutional dominance at the same time. Being aware of the nature of technology, both developments also seem to be irreversible. Consequently, they now necessitate a further checked and balanced adaptation.

This irregularity, ultimately, has far reaching implications: Issues concerning the separation of powers, the operation of legislature bodies and government agencies, the rules of civil and criminal procedure – are all significantly entwined with the ability of legal systems to design legal commands in extensive digital network environments.

[10] See, also, § III.C.1, infra.

Leaving these important implications to further research, the purpose of this study is first to explain this unique regulative incongruity. Thus, questioning the extent to which normative legal commands designed through software should be applied as rules or standards.

II.
TECHNOLOGICAL DESIGN AS NORMATIVE REGULATION

Software-made regulation can be designed to overcome normative neutrality. In such cases it would embed normative choices set by its program designers.[11] For example, privacy-enhancing technologies such as public key cryptography focus on the preservation of confidentiality in the transmission of messages. Alternatively, many networks have architectural designs and technological standards that implement the norm of open information access.

More controversial, in the forefront of today's cyberspace is Digital Rights Management (DRM) technology. In essence, DRM software identifies digital versions of copyrighted works. This is done, using two main types of existing DRM technologies: "Watermarking"[12] and "Fingerprinting".[13] Copyright owners with the intention to create digital identifications for their works implement either of these DRM technologies. They are meant to identify works that are transmitted over P2P networks,

[11] Joel R. Reidenberg, *Rules of the Road for Global Electronic Highways: Merging the Trade and Technical Paradigms*, 6 Harv. J.L. & Tech. 287, (1993), pp. 301-304; Joel R. Reidenberg, *Governing Networks,* supra note 5*,* pp. 918, 927-28; L. Lessig, *Constitution and Code*, 27 Cumb. L. Rev. 1 (1997), p. 14; Lawrence Lessig, *The Constitution of Code: Limitations on Choice-Based Critiques of Cyberspace Regulation*, 5 CommLaw Conspectus 181, (1997), p. 184; Niva Elkin-Koren, *Copyright in Cyberspace – Rights Without Laws?*, 73 Chi-Kent L. Rev., 1155 (1998), p. 1186.

[12] Watermarking are digital identificatios inserted into each digital copy of a work at the time they are manufactured.

[13] Fingerprinting are digital identifications inserted into unwatermarked content of digital copies after their manufacture. Fingerprinting converts unwatermarked works into unique digital identification marks.

as, for example, email or instant massage attachments. The purpose of that identification is that the purchase of such works could be tracked electronically. Ultimately, in case copyright owners' works are not encrypted, but are watermarked with authorized-use information, DRM technology may also provide owners with control over the different excludable right of copyright ownership. Such as, access to their works and control over the right to make copies and redistribution control. As a new form of substance regulation, law ultimately acknowledged DRM technology by law.[14]

As a normative form of regulation, software-based regulation such as DRM technology, ultimately, permits different types of legal command configurations as either mandatory commands or voluntary ones, in the form of either rules or standards.[15] As such, normative software-made regulation should arguably also be subject to the epistemological distinction and choice between rules and standards of the physical world.

[14] DRM technology is mentioned in the WIPO Copyright Treaty. The treaty refers to DRM as "technological measures" used in the restriction of unauthorized acts in copyrighted works of art. It also refers to this technology as "copyright management information" used to identify rights holders, authors and the terms of authorized use. In addition, the Treaty requires adhering nations to protect both through domestic law. See, WIPO Copyright Treaty, Articles 11-12, available at <http://wipo.int/treaties/ipwct/index.html> (last visited 15 May 2003) . At least 39 nations have become parties to the WIPO Copyright Treaty.

[15] See, e.., J. R. Reindenberg, *Lex Informatica,* supra note 5 (referring to them as inalienable commands and customization commands, respectively), p. 572. See discussion, infra.

III.
THE DICHOTOMIC ANOMALY: RULES V. STANDARDS

A. Introduction

In the legal process, it is commonly agreed that an inner division between two categories of normative legal commands exists:[16] First, a legal command as either a rule or a standard that regulates form, such as a set of formalities required in attaining a driving license. Second, a legal command that regulates substance, which can be one of two types – a default legal command (*ius dispositivum*) that is voluntary, and that is only binding given that no other binding non-voluntary command applies instead. Such are many of the contractual remedies when parties fail to specify one. Lastly, the binding command (*ius cogens*) that mandates regulation designed by the government against harm-producing behavior that is non-voluntary. Such as, banning access to web sites containing adult materials from minors surfing the Internet.

Whenever the first category of legal commands that regulate form are promoted through a rule, they would be characterized with a high level of specificity backed by an authoritative executing mechanism that leaves little room for judicial discretion. Such are many of the rules regulating civil and criminal procedural law. Then, if such commands were to be designed as standards, the level of the technical value measurements such as quantity, weight, extent or quality, they provide would typically

[16] See, e.g., H.L.A. Hart, *The concept of law* (1961), pp. 130-31; Ehrlich & Posner, supra note 6, pp. 269-70; Duncan Kennedy, Form and Substance in Private Law Adjudication, 89 Harv. L. Rev. 1685 (1976), pp. 1697-701; Kaplow, supra note 3, p. 618..

characterize them.[17] The common meaning of such formal standards would suggest legal commands established by authority as measure value measurements of a given command.[18] In telecommunications, the Internet, satellite and Radio, or other fields of technological regulation, this type of standardized commands is very common. For example, for information systems like the Internet is the well-known industry standard titled as the ISO/IEC 15288 "Life Cycle Management- System Life Cycle Processes".[19] As such, ISO/IEC 15288 establishes a common framework for describing the value measurements of a technological life cycle of systems or systems of systems and a complete set of well-defined technical production processes and associated terminology.[20] Consequentially, ISO 15288 is designed to be in complete harmonization between its predecessor - the ISO12207 (Software Life Cycle Processes) standard and with the ISO15504 (Software Process Assessment) standard, and is highly formal in nature.[21]

In network environments, though, many standardized legal commands do not fall into this category of formal commands and instead fall into the second category of commands that regulate substance. Inside that category this paper will focus on

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[17] Kaplow, supra note 3, referring to Webster's new collegiate dictionary (1977), p. 1133.

[18] Ibid, referring to *Webster's new collegiate dictionary* (1977), p. 1133.

[19] See, e.g., *ISO/IEC 15288 Website*, <http://www.15288.com/> (last visited 15 May 2003); see, also, <http://www.software.org/quagmire/descriptions/iso-iec15288.asp> (last visited 15 May 2003).

[20] See, Dictionary of software, *ISO/IEC 15288*, at: <http://www.esi.es/Help/Dictionary/Definitions/ISO-IEC_15288.html> (last visited 15 May 2003); See, also, *ISO/IEC 19760 - Guide for ISO/IEC 15288 (System Life Cycle Processes), a guide to ISO/IEC 15288* (February 2003).

[21] See, ISO/IEC 15288 Website, <http://www.15288.com/> (last visited 15 May 2003); see, also, <http://www.software.org/quagmire/descriptions/iso-iec15288.asp> (last visited 15 May 2003).

mandated commands (*ius cogens*) regulating harm-producing behavior. Whenever such commands are designed as rules, they are typically designed in an "all or nothing" application.[22] In case the facts a rule stipulates are given, then such a rule can either be valid and mandating, or, otherwise, irrelevant to the legal analysis and decision at stake.[23] Alternatively, whenever such mandated commands are designed as standards, they would instead refer to one of the substantive objectives of the legal order, stipulated as a general principle or goal of social action.[24] The most common examples are the principles of fairness, due care, reasonableness and good faith. Accordingly, the application of such a standard would require judicial ex-post intervention in the discovery of both the particular facts of the case and their legal evaluation, as it is seen through the prism of that standard.[25]

Ultimately, some harm-producing activities can be designed, as either rules or standards and any choice between the two would be a decision that regulators would be in the position to take. For example, a regulator may use a standard, and in so doing leaving any or all of such decisions for an ex-post enforcement authority. Instead, a regulator may choose to use a rule to specify the level of damages to be awarded for a given harm, set a discretionary criteria for such determination, etc. The anomaly suggested in

[22] See, e.g., Ronald M. Dworkin, The Model of Rules, 35 U. CHI. L. REV. 14 (1967), p. 25.

[23] Ibid,, p. 25.

[24] See, e.g., Duncan Kennedy, supra note 16, p. 1688; R. M. Dworkin, supra note 22 (Standards operate as principles that do not set clear legal consequences), pp. 22, 25; Isaac Ehrlich & Richard A. Posner, supra note 6, p. 270.

[25] See, e.g., Duncan Kennedy, 6), p. 1688

this paper arises with the application of what are seen as technological standards that regulate substantive harm-producing behavior, as would be argued, hereinafter.

B. The Kaplow Model

Designing legal commands in either the physical world or network environments typically involves three consecutive stages. First, the government decides whether a conduct will be governed by a rule or a standard. Such comparison is not always clear, as standards and rules differ in degree of generality, as they are the opposite ends on the continuum of legal techniques of regulation: specific rules, applying detailed legal consequences to a definite set of detailed facts, creating a sharp line between forbidden and permissible conduct; and general open-ended standards that specify only general limit of permissible conduct requiring application in view of the particular facts of the case.[26] Thus, the choice between rules and standards is also one of degree.[27] Moreover,

[26] See, Kaplow, supra note 3 (model degree of precision and time of application), p. 560 & Fn. 6 referring to Ruth Gavison, Comment: Legal Theory and the Role of Rules, 14 Harv. J.L. & Pub. Pol'y 727, 747-48 (1991), p. 750-52. See, also, Ehrlich & Posner, supra note 6 (modeling degree of presicion), p. 258; Duncan Kennedy, supra note 16 (modeling degree of generality), 1687. Such dichotomy is not upheld by all; R. Pound, Hierarchy of Sources and Forms in Different Systems of Law, 7 Tul. L.. Rev. 475 (1933), pp. 482-483, 485-486; Frederick Schauer, Rules and the Rule of Law, 14 Harv. J.L. & Pub. Pol'y 645 (1991), pp. 650-51; Pierre Schlag, Rules and Standards, 33 UCLA L. Rev. 379 (1985), p. 384; For a critical view, see, Thomas C. Arthur, Workable Antitrust Law: The Statutory Approach to Antitrust, 62 Tul. L. Rev. 1163 (1988) (rejecting sharp dichotomy between rules and standards, instead advocating a middle position in which the legislature identifies goals and offers examples as guides for courts), pp. 1225-1228.

[27] See, e.g., Kaplow, supra note 3, p. 600.

in cases when rules and standards play the same role, they may differ not even in matter of degree but in form.[28] Nevertheless, for the purpose of this paper and in reference to Kaplow's model, I will focus on the distinction between them in pure type. In the second consecutive stage, individuals make their behavioral choices, either in compliance with given legal commands or not. However, given that they are imperfectly informed, before making their choice, they first choose whether to acquire legal advice about he content of such rules or standards. Lastly, rules or standards are enforced so that legal commands would be applied.

In compliance with this legal framework, and according to the model designed by Louis Kaplow, the dichotomy between such substantive rules and standards can be seen as a product of a tension between two types of costs. Ex-ante costs associated with promulgating legal norms and those of enforcing them ex-post.[29] Standards that regulate substance tend to have lower initial promulgation costs relative to rules, but higher enforcement costs. As Kaplow suggests, rules are typically more costly to promulgate than standards because rules involve ex-ante determinations of the law's content. In contrast, standards seem to be more costly for enforcement authorities to apply or legal advisors to predict due to their ex-post constraint in determining the content of these standardized legal commands.[30] For example, a rule may require an

[28] R. M. Dworkin, supra note 22, p. 28.

[29] L. Kaplow, supra note 3, id; For an earlier analysis, see, Louis Kaplow, A model of the optimal complexity of legal rules, 11 J.L. Econ. & Org. 150; See, also, Frederick Schauer, supra note 26, id. For examples of rules as ex-ante regulation, see Colin S. Diver, The Optimal Precision of Administrative Rules, 93 Yale L.J. 65 (1983).

[30] L. Kaplow, supra note 3, pp. 562-563

advance determination of what constitutes permissible driving speed in urban roads, while a standard may require leaving both specification of what speed is permissible and other factual issues for the adjudicator. Thus, a standard might prohibit reckless driving at an excessive speed on urban roads, leaving only factual issues for the adjudicator.[31] Ultimately, when standards are utilized ex post, the value of alternative rules would typically be smaller and any promulgation of rules in such cases would be an inefficient form of design of legal commands.

In network environments, technological standardization behaves differently. It has high ex-ante specification costs, but low ex-post enforcement costs, as it is relatively expensive to develop and produce but automatically and cheaply self-enforcing by design. Moreover, to the extent that there are economies of scale in technological standards, ex ante extensive investments may be superior. That conclusion only comes to follow the experience of the physical world according to which economies of scale in information acquisition prefer ex ante wholesale investments.[32]

Thus, there are typically few advantages in delayed investments because information will be easier to acquire at the time individuals act or cases are adjudicated. As in the case of legal standards, technological standards are now arguably less closely resembled to legal standards than previously assumed.

[31] Ibid, pp. 559-560.

[32] L. Kaplow, supra note 3, p. 587.

Following what is an internal constraint regarding the distinction between rules and standards lays also an external one, regarding institutional administration costs. Together both constraints now suggest further conceptual and practical conformity.

C. Internal concerns

1) Ex ante promulgation costs

In the physical world, it is usually assumed that standards are relatively cheaper to produce and keep up-to-date than rules.[33] The rationale for that is that standards are given content in an authoritative manner just when they are applied to particular behavior.[34] Technological standards, through, are relatively much more expensive to produce than legal standards. The reasons for that are several.

First, like rules, technological standards are increasingly detailed and specified and thus less general and heterogeneous in content. For example, file-sharing software that would uphold copyright liability in MP3 digital works of art would be a rule whose violation could lead to technological anti-measurement enforcement such as, loss of

[33] Ibid, p. 616 and Fn. 168, referring also to Richard A. Posner, Economic Analysis of Law (4th ed. 1992), § 20.3, at 543.

[34] The main point to recognize is that there is no universal tendency for standards as they are actually applied to be more complex than rules that would plausibly be promulgated. See, L. Kaplow, p. 596. In Kaplow's model and hereinafter, the complexity of legal rules refers to the number and difficulty of distinctions the rules make. See, also, L. Kaplow, supra note 29, p. 150. But more complex rules are more costly for individuals to understand ex ante and for a court to apply ex post. See, ibid, id.

access or self-destruction of that file. Gradually, copyright owners in network environments would not only be able to control the duplication of copyrighted materials, but would also be able to control the actual use of copyrighted materials. They could control how often a text would be accessed, or red, according to whether the user would have the ability to cut parts of the text and paste them into other texts, and whether text could be printed, and how many times. Ultimately, they could control whether such works of art could be shared.[35] Clearly, upholding alternative social values can channel technology otherwise.[36] Thus, a free access file sharing technology that may uphold a general copyright fair use norm would be a standard whose violation would lead to flexible damage compensation upon ex-post legal interpretation. Nevertheless, with the commercialization of the Internet, followed by a substantive growth in the number and influence of de facto standard setters, the latter type of technological standards is increasingly replaced by the former.[37] Thus, unlike rules or technological standards, original standard norms leave open to ex-post adaptation what

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[35] See, Mark Stefik, *Shifting the Possible: How Trusted Systems and Digital Property Rights Challenge Us to Rethink Digital Publishing,* 12 Berkeley Tech. L.J. 137 (1997(; Humans, Computers & Binding commitment, 75 Ind. L. J. pp. 1130-31; Mark Stefik, *Trusted Systems*, scientific American, March 3, 1997; Jonathan Weinberg 52 Stan. L. Rev. 1251 Stan. L. Rev. May, 2000 Symposium Cyberspace and Privacy: A New Legal Paradigm? *Hardware-based IID, rights management, and trusted systems*.

[36] See, primarily, Dan L. Burk & Julie E. Cohen, *Fair use infrastructure for rights management systems*, 41 Harv. J. of L. & Tech (2001); Julie E. Cohen, *Lochner in Cyberspace: The New Economic Orthodoxy of "Rights Management"*, 97 Mich. L. Rev. 462 (1998); Julie E. Cohen, *Some Reflections on Copyright Management Systems and Laws Designed to Protect Them*, 12 Berkeley Tech. L.J. 161 (1997); Julie E. Cohen, *A Right to Read Anonymously: A Closer Look at "Copyright Management" in Cyberspace*, 28 Conn. L. Rev. 981 (1996).

[37] See, e.g., Kevin Werbach, *Digital Tornado: The Internet and Telecommunications Policy* (FCC OPP Working Paper Series 29, March 1997), at: <http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp29.pdf> (last visited 15 May 2003), p. 17.

constitutes a general norm as the fair use doctrine in copyright law and how to calculate damage compensation. Such standards are now of lesser influence in technological content regulation. In essence, technological standards are decreasingly general and need less interpretation.

Moreover, technological standard setting is less and less done in anticipation of innovative activity, as it was in the early development phase of the Internet and, similar to rule making,[38] technological standard setting is more predictable.[39] In fact, in the early development phase of the Internet, anticipatory standardization acted as mechanisms for collective planning and were the embodiment of a central institutional policy.[40] Accordingly, anticipatory standardization serves as an additional rationale favoring central standardization of that early technological phase. Due to the fast-moving pattern of commercial software design, such anticipatory technological standardization is now practically 'dead'.[41] In essence, rules like technological standards influence behavior directly. Legal standards are made to influence behavior

[38] Kennedy, for example, suggests that, at least since Ihering, it is been commonly agreed that that the two great social virtues of formally realizable rules are the restraint of official arbitrariness and certainty. Duncan Kennedy, supra note 16, p. 1688.

[39] T. M. Egyedi, *Institutional Dilemma in ICT Standardization: Coordinating the Diffusion of Technology*, 48, In Information Technology Standards and Standardization: A Global Perspective (K. Jakobs, ed.) (IDEA Group Publishing, 1999) (suggesting that, in fact, application standards development has began to occur in parallel), pp. 54-55.

[40] See, M. J. Bonino & M. B. Spring, *Standards as change agents in the information Technology market, Computer Standards & Interfaces* (1991) 12, p. 99 et al.

[41] In a conversation with Carl Cargill, he further suggested that anticipatory standard-setting activity (as in the early phase of cyberspace standardization), is now practically 'dead' followed by the shift to standardize 'existing practice'.

indirectly. In that regard technological standards are more similar to rules than to legal standards as their scope of influence increases.

Moreover, rules are more often updated than standards.[42] Typically, the more detailed a rule is, the more often it will have to be changed. The greater amount of detail of a very precise rule is thus also a source of additional costs, namely the costs of changing rules, which include the costs of producing the new rule plus additional costs arising from the fact that change in the law is a source of uncertainty.[43] Consequently, the greater the amount of detail in a rule, the lower are the costs of imperfect precision in one subject-matter respect of that rule and the higher they are in another.[44] Standards, in contrast, are relatively unaffected by changes over time in the circumstances in which they are applied. The reason is that, as explained, a standard does not specify the circumstances relevant to decision or the weight of each circumstance but instead only generally indicates the relevant kinds of circumstance.[45]

Aggregate revision costs of rule making are, therefore, higher than those of standard setting. Standards are given finite content only when they are applied to particular conduct. Until then, standards bare little or no revision costs. Thus, a standard promulgated decades ago can be applied to conduct in the recent past using present understandings rather than accumulative revisions from earlier phases. In contrast,

[42] See, L. Kaplow, supra note 3, p. 596; Isaac Ehrlich & Richard A. Posner, supra note 6, p. 278.

[43] Ibid, id.

[44] Isaac Ehrlich & Richard A. Posner, supra note 6, p. 278.

[45] Isaac Ehrlich & Richard A. Posner, supra note 6, p. 277.

technological standards, like rules, must be revised and updated relatively more often than legal standards. In practice, technological standards have increasingly shortened product life cycles that then also require more product generations such as the Internet Explorer browsers.[46]

2) Ex post enforcement costs

Standards and rules also differ on the strength of enforcement.[47] In the physical world, it is commonly assumed that as general and normatively vague - standards are costly to enforce relative to rules. Following Diver's suggestion, increased precision may increase compliance and decrease evasion or concealment costs in two aspects.[48] First, increased precision, as with rules, reduces the cost of determining the rule's application to an actor's intended conduct.[49] In addition, the ease of enforcing transparent rules discourages would-be violators from making socially wasteful efforts to avoid compliance.[50] Lastly, detailing the law efficiently, as made possible through rule making, results in an increase in the expected gain from engaging in socially desirable activity relative to that from engaging in undesirable activity.[51]

Arguably, technological standards are relatively less expensive to enforce than legal standards. The reasons for that are largely threefold. First, technological design can

[46] See, C. F. Cargill, supra note 5, pp. 170-174.

[47] See, e.g., Ruth Gavison, supra note 26 (suggesting that only the strength of entrenchment and not breadth be incorporated in the concept of ruleness).

[48] Colin S. Diver, supra note 29, p. 73.

[49] Ibid, id.

[50] Ibid, id.

automate enforcement and thus cheapen it. Technological standards offer two particularly valuable enforcement advantages that reduce its costs. Technological devices can be readily developed to monitor compliance with both general legal norms and specific policy rules.

Thus, technological standards may be designed to prevent actions from taking place without proper permission or authority. For example, cryptographically based trust management mechanisms that is cryptographic software designed to check validity of passwords for electronic payment orders on-line and verify that a corporate officer entitled to issue such payment orders holds passwords. If either the password is fraudulent or the holder does not have the rank permitting payment orders, such technological standards could block execution. Technically, technological advance allows programmers to include in their technological standards built-in automated self-enforcement and thus reduce enforcement costs. This capability and practice is different than with legal standards. In the latter, enforcement costs are notably high relative to these of rules. In essence, technological standards offer alternative automated and self-executing rule enforcement and behave more similar to rules than to legal standards.

The second aspect of increased compliance suggests that technological standards, like rules, adapt to the preferences of risk averse individuals. Applying standards typically generates significant costs for both judges who have to determine whether the defendants have complied and for actors who have to determine the level of precaution

[51] Isaac Ehrlich & Richard A. Posner, supra note 6, p. 262.

necessary to escape liability. If, however, the cost of predicting is high, individuals will not choose to become as well informed about how regulation would apply to their behavior. Risk aversion of individuals is, therefore, relevant to the analysis of rules and standards for two reasons.

First and foremost, individuals will place a greater value on ex-ante legal advice because advice reduces their uncertainty.[52] As a result, as a factor favoring rules, it may be more valuable for the cost of legal advice to be low.[53] Ultimately, if the benefits of learning the law's content are notable and whenever the costs of legal advise is low, individuals' conformity to legal commands increases.[54] In accordance, individuals will not choose to become as well informed about how standards would apply to their behavior due to the typically high costs of predicting how an enforcement authority will decide to apply standards.[55] The advantage of rules in this case would be improved legal compliance, which might induce behavior that is more in accordance with its underlying norms.[56]

Accordingly, individuals are more informed under legal rules than under legal standards. In essence, the manner of promulgating legal commands affects whether individuals acquire advice and how they behave accordingly. With technological

[52] L. kaplow, supra note 3, p. 605.

[53] Ibid, p. 605; Isaac Ehrlich & Richard A. Posner, supra note 6, p. 270.

[54] Ibid, L. kaplow, p. 596.

[55] Ibid, pp. 565-566; Isaac Ehrlich & Richard A. Posner, supra note 6, p. 270.

[56] Ibid, L. Kaplow, pp. 565-566; Isaac Ehrlich & Richard A. Posner, supra note 6, p. 270; Richard A. Posner, The problems of jurisprudence 42-53 (1990), pp. 44-45.

standards, a similar level of rule awareness is present. As highly sophisticated products, the "quality" of the consumer decision-making processes is largely facilitated through on-line certification mechanisms. Technological standards are, in fact, technically advanced products in markets where information as to quality is more costly to supply and process than information as to price because performance is multidimensional and may require various value measurements.[57] There, public agents hold sufficient information so to make appropriate quality judgments and then certify them by attaching a consensus around individual technologies. They act ex-ante as a monitoring proxy for average consumers approaching technological standard markets. In that way technological standards increase the level of individual understanding of their content and the consequential level of compliance with their commands, as in the case of rules.

Secondly, whether the ideal time to acquire and disseminate information about legal commands is ex ante or ex post depends, most importantly, on the frequency of individual application and on adjudication.[58] In general, rules are increasingly desirable relative to standards the greater the frequency with which a legal command applies. This result occurs for the reason that promulgation costs are borne only once, while efforts to abide by and action to enforce the law may occur rarely or often.[59] Consequently, when frequency is low, a standard tends to be preferable.[60] This is yet

[57] T. M. Jorde & D. J. Teece, *Antitrust, Innovation and Competitiveness* (Thomas M. Jorde & David J. Teece Eds.) (Oxford University Press, 1992), p. 9. Compare: G. A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q. J. Econ. 488 (1970).

[58] L. Kaplow, supra note 3, p. 563.

[59] Ibid, p. 577.

[60] Ibid, p. 563.

another difference between legal standards that are typically less frequently used and adjudicated (whether because most acts do not give rise to lawsuits or because they are settled[61]), and technological standards that like mass-consumption products are used much more frequently.

D. External concerns - Institutional administrative costs

Standards decentralize decision-making and delegate more decision making power to delegated agents, particularly government agencies and judges.[62] Rules, in contrast, imply centralized decision making, as decisions according to rules facilitate the social control of decision makers. The reason is that rules are typically efficient in reducing mistakes and in usurpation by adjudicators. Thus, the creation of a legal rule may simply shift the rule-making function from the private to the public sector. [63] Arguably, this is also the experience in network environments like the Internet. With the commercialization of the Internet in the mid 90's consumer oriented de facto standard setters established a solid hegemony over the technological standardization industry of the net. Commonly known as informal standards (including *de facto, gray* or *ad hoc*[64] standards), such activity is now dominated by non-legally binding autonomous market forces (*de facto)* or even particular groups such as, non-profit organizations or

[61] Ibid, p. 563.

[62] Isaac Ehrlich & Richard A. Posner, supra note 6, p. 267.

[63] Ibid, id.

[64] For a preliminary description of Ad Hoc standard setting activity and institutions, see, e.g., Martin C. Libicki, *Information Technology Standards: Quest for the Common Byte*, (Digital Press) (1995), pp. 18-20.

consortia[65] (*gray*) standardizing autonomously.[66] For several economical and political grounds that led to the commercialization of technological standards in network environments like the Internet this reality is most likely irreversible.

Conversely, rule making is optimally efficient whenever it is centralized with less decision-making power to delegated agents. In cyberspace, though, technological standardization in bound to remain institutionally autonomous, as today's technology may limit the ability of governments to program and design software-made regulation efficiently. This is for several reasons. First, in network environments rapid technological developments generally outpace the rate of slow ex-post bureaucratic decision-making evolution.[67] Consequently, today's adjudicative evaluation may easily pertain to yesterday's technologies. Second, information flows may be impervious to the actions of a single regulator, as in technological regulation. Instead technological research and developments (R&D) joint ventures would become essential. Third, once centralized production patterns are adopted, they acquire a taken-for-granted quality

[65] For a preliminary description of consortia, see, Roy Rada, *Consensus versus Speed,* In Information Technology Standards and Standardization: A Global Perspective (Kai Jakobs ed.) (2000) 19, pp. 30-31; For a description of gray standardization institutions, see, e.g., T. M. Egyedi, supra note 39, pp. 54-55.

[66] C. F. Cargill, supra note 5 (focusing on consortia, the government, anf formal industry standardization organizations), pp. 117-131, 255-161, 275-296; M. A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 Conn. L. Rev. 1041, (1996) (focusing on the government, industry players and de facto standards); M. A. Lemley, supra note 7, p. 747; B. Toth, *Putting the U.S. Standardization System into perspective*, StandardView, 4(4) (for a review of the presiding organizations inside the U.S.), pp. 169-178.

[67] Martin C. Libicki, supra note 64, p. 354; S. Breyer, *Regulation and Its Reform* (Harvard University Press, 1982), p. 106.

and are not easily dismissed or changed.[68] In cyberspace, however, technological revision is constant and product life cycles for each technological standard are notably shorter.[69] Fourth, fundamental to the developments affecting technological standardization is the emergence of a global economy in which the United States, as other national governments, might not always play the predominant role in technological standardization in the first place.[70] Thus, centralized nationalization of technological production is replaced by international, yet decentralized, cooperation between de facto standardization organizations.

Overall, while decentralized competitive agents may replace an inefficient technological standard by competitive technological "leapfrogging", there are, typically, fewer guarantees that centralized governments will or could do the same. Nevertheless, whenever the content of technological standards is similar to rules – both also comply with the paradigm of centralized institutionalism, as opposed to with legal standards. Whenever decentralized institutions are the most efficient in regulating substantive legal commands - that reality ultimately creates a democratic vacuum as a result of the privatization of such centralized regulative activity. Typically, the task of formal political institutions such as governments and formal (*de jure*) industry standardization organizations should be to confirm the legitimacy of choices made, by

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[68] G. March & J. P. Olsen, *Rediscovering Institutions* (1989), p. 52.

[69] C. F. Cargill, supra note 5, pp. 170-174.

[70] See, e.g., Linda Garcia, *A new role for government in standard setting?*, StandardView vol. 1, No. 2, December/1993 2 (suggesting that in the globalized era, the influence of the United States have decreased substantively in comparison tothe past in determining the character of international standards institutions), p. 5.

securing that relevant people are involved and by an appropriate control structure over decentralized production of such software-made regulation.[71] These same elements are arguably becoming evident also in standardization 'ideology', as they define the role of formal standard setting organizations as guardians of the process.[72]

One recent problematic example of that front is the treatment given to the copy protection method proposed for digital television broadcasts that is known as the "Broadcast Flag System".[73] Its constituting bill – commonly known as the "Hollings Bill" – would have required "digital media devices" to provide 'effective security for copyrighted works".[74] In the background of these DRM technological developments, the FCC had issued a Notice of Proposed Rulemaking by which the commission invited comments on whether it should mandate the integration of DRM copy protection technology into television receivers and other consumer electronics devices, like digital TV recorders.[75]

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[71] See, e.g., G. March & J. P. Olsen, supra note 68, pp. 50-52.

[72] See, e.g., Louis G. Tornatzky and Mitchell Fleischer, *The Processes of Technological Innovation* (1990), pp. 41-42.

[73] It is in the center of a bill in the 107th Congress formally entitled the "Consumer Broadcast and Digital Television Promotion Bill". See, available at: <www.copyright.gov/legislation> (last visited 15 May 2003).

[74] The 107th Congress adjourned without voting or enacting on the Hollings Bill. Nevertheless, the efective date of nationwide digital TV broadcasting is independent of the bill's status and would not be delayed.

[75] In the Matter of Digital Broadcast Copy Protection, MB Docket No. 02-230 (FCC Aug. 8, 2002), available at <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-231A1.pdf> (last visited 15 May 2003).

In compliance, a coalition of private copyright owners, broadcasters and entertainment industry unions is urging the FCC to adopt a rule that would support their private interests, requiring such devices to recognize and respond to "Broadcast Flags" included in digital TV broadcasts, through Flags that would designate whether those broadcasts may be redistributed outside the recipient's home.[76] This type of reaction to Broadcast Flag System technology is, arguably, over inclusive as Broadcast Flags do not encrypt digital TV signals. Instead, those signals will be broadcast unencrypted. As a result, the system is made to work only if devices that receive and process digital broadcasts are designed to recognize whether particular signals may be redistributed outside the recipient's home, and only if those devices do not permit redistribution if a signal's Broadcast Flag does not authorize it. In balance, the FCC agency should now act to check and balance this arguably over inclusive privatization trend of technological regulation of substantive commands. That is, as part of an adapted constitutional framework for software-made regulation for network environments.

[76] Joint Comments of the Motion Picture Association of America [and others] in the Matter of Digital Broadcast Copy Protection, available at <http://mpaa.org/press/MPAA_Comments_02-230.pdf> (last visited 15 May 2003).

IV.

SUMMARY AND CONCLUSIONS

Policy makers should accept and take advantage of the distinguishing features of software-made regulation for controlling information flows on global networks. Conceptually, substantive technological design of normative content, such as DRM technology, indeed offers a unique technique in regulation theory. Due to technological developments, such software-made regulation assumed originally to be designed as standards are increasingly characterized as rules. In regulation theory, rule making is typically considered to be a regulative activity best promulgated by centralized institutions, and primarily government regulation. In network environments such as the Internet, however, centralized regulation seems to be inefficient in keeping pace with the dynamic commercialized nature of the technology. Thus, the technique commonly known as technological standardization is still best kept decentralized.

In essence, two contradicting developments are now occurring in parallel in network environments, creating a regulative anomaly. On the one hand, technological-made regulation on-line is more characterized like rules instead of standards, thus conceptually implying regulative centralization. On the other hand and at the same time, decentralized regulation, better associated with standard setting, is increasingly gaining institutional dominance. Being aware to the nature of technology, both developments also seem to be irreversible.

Similar to rules, technological design may be normative, contextual, direct and enforcement-enable. Ultimately, policy makers must be involved early in the development phases of new technologies to assure that these options and flexibility are maximized. Notwithstanding the prescribed institutional constraint in network environments, this paper wishes to recommend to policy makers adapting a rule-oriented approach, backed by an adapted system of checks and balances. With the efficiency constraints on government promulgation of software-made regulation - formal (*de jure*) industry standardization organizations already seem to be filling this democratic vacuum by standing to the challenge. Typically, the task of formal political institutions should be to confirm the legitimacy of choices made, by securing that relevant people are involved and by an appropriate control structure over decentralized production of regulation.[77] These same elements are arguably becoming evident also in standardization 'ideology', as they define the role of formal standards bodies as guardians of the process.[78] Nonetheless, for that type of solution to be justified – there is a need to acknowledge the earlier suggested regulative anomaly and then minimize its effects.

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[77] See, e.g., G. March & J. P. Olsen, supra note 68, pp. 50-52.

[78] See, e.g., Louis G. Tornatzky and Mitchell Fleischer, supra note 72, pp. 41-42.