Multilevel Governance of the Digital Space: Does a “second rank” Institutional Framework exist? *

Eric Brousseau

University of Paris X, Institut Universitaire de France, EconomiX

Université de Paris X, Bâtiment K, 200 avenue de la république, F-92001 Nanterre Cedex, France

Tel: (33) 01.40.97.59.22

Fax: (33) 01.40.97.59.07

eric@brousseau.info

www.brousseau.info

This Version: 27/07/05

Abstract:

Digital Technologies make it possible to decentrally settle institutional frameworks based on self-implementation of exclusive rights of use over information and on the self-regulation of on-line communities. Such a decentralized systems of IPRs and collective rules settlement would enable agents to benefit from coordination frames well adapted to their specific needs and preference. However, such a process can also result in inefficiencies. While becoming subject to exclusion, information and coordination spaces remain non-divisible goods. Moreover, individual and group of interests could succeed in taking a non-contestable control over “privatized” information spaces. To overcome these weaknesses and threats, an institution of last resort — overhanging the agents and the self-regulated communities — should design and make enforceable constitutional principles aimed at guaranteeing some fundamental rights of contents producers and users. Based on the principle of subsidiarity, it should supervise the behaviors of individuals and communities to prevent capture of public wealth by individual interests, to solve conflicts among claims and local regulations, to guarantee enforcement when exclusive rights of use are legitimate. The way to implement it is however questionable since neither central authority of last resort nor global community exist to implement it. A combination of open while centralized negotiations among public and private norm settlers and of conflict settlement mechanism aimed at harmonizing the proliferating orders could nevertheless lead to the progressive definition of such constitutional basic rights and principles.

JEL : H4, K2, L4, L5, L9

* A Grant provided by The CNRS Interdisciplinary Research Program on the Information Society supported the underlying research. This paper benefited from fruitful discussions and useful suggestions made by participants to the workshop “Governance, Regulations, Powers on the Internet” held in Paris in May 2005 and co-organized with Meryem Marzouki. LIP6/PolyTIC, CNRS) and Cecile Meadel. CSI, Ecole National Supérieure des Mines de Paris). Comments by Niva Elkin-Koren (University of Haifa and New York University. Willam J. Drake (International Centre for Trade and Sustainable Development) and Yves Schemel (University of Grenoble and IUF) were especially helpful. The paper was also discussed for the workshops organized to prepare this book. I warmly thank participants and discussants. Usual caveats apply.

0. Property Rights as a Way to Think Regulations

In any economic space, a set of fundamental rules delineates the rights to use economic resources and allocates these rights to interacting agents. The activity of settling these “rules of the game” played by agents can be qualified as regulation. This broad definition of regulation is useful for at least two purposes. First, it allows using a common framework to think both the so-called “self-regulation” and the “State regulation”, since it does not refer to the entity that set up the “rules of the game” for the “players”. Indeed, it can either be some exogenous third part — like the State — or the players themselves that (consciously or not) interact and set collective rules. Second, in the spirit of Ronald Coase (1960), this definition makes it clear that the management of externalities, public goods and other sources of “market failures” is a component of the activity consisting in organizing the framework allowing agents to interact and exchange¹, and that refer the notion of property rights (PRs) system as stated by Yoram Barzel (1989) and Douglass North (1990). By delineating and allocating rights of uses to economic agents, a PRs system establishes the way they can individually or collectively make decision about the uses of resources. In that general understanding, setting a PRs system implies four major activities: setting rules; supervising their enforcement and punishing infringes; settling conflicts, since there are always ambiguities in rules and therefore different interpretations; and implementing decisions mechanisms when rules do not apply, since there are always some incompleteness in a system of rules.

A property right approach to regulation is useful to analyze the way the Internet is governed, because the cyber-world is increasingly considered as a model for a new regulatory regime based on a decentralized and State-free regulation often qualified as self-regulation². At first sight, the Internet and the Internet based activities have been developing on the basis of governance mechanisms based on contractual agreements or communities' self-regulations. This is due both to the global connectivity provided by the Internet (end-to-end) architecture and (open) standards — which allow to easily bypass traditional state norms —, and to the coding and tracking capabilities provided by digital technologies — that allow to implement self-enforceable property rights and rules at a (relatively) low cost (see below).

This paper is an attempt to analyze the principles that should inspire an institutional framework, which would be adapted to the regulation of the Internet and related activities. This will lead to an analysis of why some aspects of the coordination of activities should be centrally managed, and why hierarchical principles should be implemented to organize the relationships among regulatory bodies. We will first review the reasons why the technology challenges the traditional institutional framework (1). We will then review the contributions of the economics and multi-level governance and of federalism to set up the principles that should inspire the institutional design behind the regulation of the digital world (2). This will lead us to analyze the specificities of the problems raised by the governance of the Internet, so

¹ Indeed “Public Regulation” refers to the setting of limits in the use of resources (or obligations to use them in a specific way). A “regulation” — in the traditional understanding — consist therefore in setting more precisely the user” rights actually granted to the owner of a given asset (like an infrastructure).

² However, careful observation of the facts lead one to qualify this simplifying view. The establishment of technical standards and above all the management of the addressing system are centralized (cf. Note 3). States also play an essential role. The US Government is the main inventor in the Internet, and remains the owner of the addressing system, even though its management is delegated to a non-governmental organizations (see Eric Brousseau, 2001, 2004 and section 4 below).

as to highlight the principle that should inspire an ideal governance architecture (3). Actual governance mechanisms and the design of new ones seem however to drive the system away of this ideal type (4). We will then analyze the available mechanisms that would favor a more satisfying path of evolution (5).

1. What is new with the Internet?

In the following pages, we will deal with the regulation of, both, networks (infrastructures and services)³ and contents⁴. While Internet technologies enable the separation of the management of the network services from the management of the information services, the strong technical and economic interdependencies between the two call for a simultaneous analysis of their regulation. Today Internet is *de facto* co-regulated by National Governments — that intervene however without strongly co-coordinating among themselves — by professional entities — whose competencies overlap and which are not always legitimate — and instances responsible for the technical standardization and management of the system; in particular the ICANN (*Internet Corporation for Assigned Names and Numbers*; <http://www.icann.com/>, the IETF (*Internet Engineering Task Force*; <http://www.ietf.org/>) and the W3C (*World Wide Web Consortium*; <http://www.w3.org/>) — that are very dynamic, but that lack strong institutional roots (See the introductory chapter and section 4 below; see also Eric Brousseau (2001, 2004). These various entities contribute to design rights of uses over information flows or network components.

The fuzzy set that regulates the Internet draws from a recent, but rich, history during which computer scientists working within US governmental agencies progressively established the

³ Internet is not a network *per se*, but a network of networks that relies on common standards and a decentralized network administration. Two types of essential resources ensure the performing of the network.

- A single *addressing system* enables any information-processing device (IPD) connected to the network to identify the other IPDs to route the requests and the replies among them. On the Internet, the *addressing system* is made of two layers. First, a numerical address is allocated to each of the IPDs connected to the network: the *Internet Protocol Number*. *IP Numbers* are machine only readable addresses. Second, a "user-friendly" addressing system — the *Domain Name System* (DNS) — is implemented to allow Internet users to express their request in a language that is closer to natural language.
- *Standardized languages* have to be spoken by the IPDs to manage both communications among them and co-operative information handling processes. Internet is based on the use of two types of standards. The *Internet Protocol* (IP) is the common communication protocol that makes it possible to manage data flows among IPDs. *HyperText Markup Language* (html) is the multimedia language that enables any IPD to transform any kind of information (data, sound, image, etc.) into codes that can be "understood" by any other IPD. This is a common programming language that allows heterogeneous devices to inter-operate when processing information.

⁴ According to the Working Group on Internet Governance working in the frame of the World Summit of the Information Society (see below section 4. "Internet governance is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet". It encompasses therefore the management of infrastructure and of critical Internet resources (addressing system, communication protocol, standards, etc.. issues related to the management of priority, reliability and security over the Internet (including spam, network security, cybercrime, consumer protection, privacy, etc.. and issues that are relevant to the Internet, but with impact much wider than the Internet, which include competition policy, regulation of e-commerce and e-business, intellectual property rights (IPRs. and also freedom of expression, freedom of the press, multi-linguism and multi-culturalism; these later dimensions being highlighted in particular by many of the stakeholders involved in the WSIS process. It proves, nevertheless, that it is quite impossible to disentangle the management of content and container since the regulation of the later aspects determine how agents can be empowered or not to manage the contents.

technical principles that govern the management of a decentralized network. This effort was then transferred to private initiatives when the Internet became commercial and open to private investments (Barry Leiner et alii, 2000). Earlier and later, regulation initiatives bypassed the traditional intergovernmental mechanisms of international standardization and regulation (Eric Brousseau, 2001, 2004). Four main reasons explain this. First, the velocity of innovation in both digital networks and multi-media technologies was quite incompatible with the slowness of these international or intergovernmental agencies. Second, until 1998, Internet was essentially a US network, and it is still dominated by US players today. Third, the liberal ideology of, respectively, the inventors and the entrepreneurs of the Internet, explains their mistrust in international or intergovernmental bureaucracies. Fourth, technology enabled to implement regulatory principles on a decentralized basis.

The present institutional framework is problematic for at least two reasons. First, it is partly inefficient in the sense that there are incompleteness, conflicts, and defaults in enforcement in the set of implemented rules. Second, the current processes used to establish these rules do not guarantee that the interests of all the stakeholders are fairly taken into account. It is therefore necessary to investigate what should be the basic principles of the regulation of the cyber-world. Indeed, many specialists advocate that, beyond a common minimal technical regulation —the publication of open standards and a transparent management of the addressing system — the Internet and its uses should be decentrally self-regulated. The combination of an abundance of essential resources, strong competition among information and network service providers, and the ability to decentrally configure the services supported by the network according to the preferences of the users is supposed to allow adaptation to each and everybody's preferences, without fearing conflicting uses and capture (as summed up by Brett Frishman, 2000 and Niva Elkin-Koren and Eli Salzberger, 2000).

Before discussing this view, let us remind the reader why the Internet and digital technologies change deeply the economics of regulation and more generally the economics of institutional frameworks. Following a New Institutional approach, it is indeed useful to consider institutional frameworks as “social technologies” which impact on economic efficiency, both because they have to be considered as a production means and because they are costly to produce. A cost/benefit analysis has therefore to be applied to institutional frameworks.

According to Yoram Barzel (1989) and Douglass North (1990) any institutional framework can be analyzed as a Property Rights (PRs) system, this later notion referring to a set of rules and mechanisms that delineates right of uses over economic resources and allocates them to decisions makers so as to enable them to take economic actions⁵. A PRs system is based, first, on a delineation (measure) of these rights of uses — consisting in setting the frontiers among different ways of using resources and among regimes for appropriating the output of these uses — and on a process of allocation of these rights — that are granted to individuals or groups —, which together generates measurement costs. Second enforcement mechanisms implement these rights of uses by excluding every unentitled agent from access to the

⁵ This very fundamental understanding of property rights clearly differs from the legal notion of property rights, but the later is included in the former. Yoram Barzel and North's analysis aims at synthesizing how an Institutional framework result in economic properties through the allocation of decision rights to agents and through their ability to be exchanged (to reach a more efficient use of resources). Their definition of property rights encompasses what we usually call property rights, but also the regulations that bound economic agents decision's rights, the law that establishes boundaries to the free will of agents, and the informal rules (such as social customs) that mitigates and frame individual freedom of decision, and the contracts since they allow agents to delineate the rights of use transferred to other agents.

protected resources, or from capturing the output of its use. This refers to controlling access, supervising uses, granting authorization for uses and punishing unauthorized uses (either to get damages or to dissuade potential infringers) and generates enforcement costs.

Digital technologies and the Internet architecture have an essential impact on both measurement and enforcement operations. Indeed, due to the decreasing cost of information processing, and to the increasing capabilities of Information and Communication Technologies (ICTs. and to the decentralized management of the Internet individual agents have access to capabilities that allow them to individually implement property rights (A) and to set-up self-enforcing collective rules (B) at a much lower costs than before. Moreover, the efficiency and the credibility of traditional regulatory frames are challenged by digital technologies (C).

A) Coding and Tracking as a way to decentrally design and enforce property rights

Digital technologies allow implementing a self-enforcing system of property rights over information goods and services (Lawrence Lessig, 1999). Indeed any set of information that is codifiable in a computer can be either encrypted to control *ex-ante* its uses (code of access) or easily, instantaneously and cheaply tracked to control *ex-post* how it has been used. Moreover, digital technologies allow implementing at very low cost customized conditions of exchanges over contents, since contracts governing information exchanges are made self-enforceable through digital codes. This enables agents to tailor the conditions of exchanges of intangibles to the specificities of the exchange and of the parties. These lead to a more "decentralized" setting of property rights as it could be deduced from the framework of Yoram Barzel (1989) and Douglass North (1990).

As analyzed in Eric Brousseau (2001, 2004 a, b) digital technologies provide content creators and network operators with means to de facto self-claim and implement property rights by enabling them to control access to their resources. They also make it possible to finely tune at reasonable costs the transfer of these rights of access and of uses among economic agents. Decentralization allows to benefit from a more efficient property rights system, since any centrally settled rules never perfectly fit to the local individual needs and constraints, resulting in maladaptation costs born by the users of the rule (see section 2, and the analyses by Yoram Barzel, 1989; Douglass North, 1990; Eric Brousseau and Emmanuel Raynaud, 2005).

B) Information spaces as a way to implement self regulations

Nonetheless, individual property rights can be individually measured and enforced, but also collective regulations can be more decentrally designed and enforced. Digital networks relying on the end-to-end principle allow creating "information spaces" and controlling access to them. These information spaces can be of very different nature: mailing lists, secured websites, forums, intra and extranets, etc. In each case, some individual or entity is in charge of managing the list of subscribers who can access to the common space. This entity therefore controls inclusion-in/exclusion-from the resulting on-line community aimed at sharing resources or at interacting within the closed space. Control of access allows implementing a collective regulation since those who would not comply would be denied from accessing the information space. It is essential to point out that the collective regulation can of course concern the use of the network or the access to contents. However, it can also organize more broadly the interactions among the members of the on-line community. For fear of exclusion

of the information space, individual can comply to on-line settled regulations, even if their interactions are partly performed off-line (like in the case of a transaction of a tangible good).

Thanks to this ability, information technologies considerably reduce the costs of implementing self-regulations. Well known by historians and anthropologist (e. g. Lisa Bernstein, 1992, 1996; Robert Cooter, 1994, 1996; Mark Granovetter, 1985). self-designed and self-enforced regulations allow communities to implement collective order either to organize collective action or to solve coordination difficulties. However, the efficiency of self-regulations decreases when communities become larger and more diverse. Indeed, each infringer is less visible because information circulates less efficiently. Moreover, each member of the community has fewer incentives to practice retaliations since they are costly and since a member's individual action is less visible (Paul Milgrom et alii, 1990). Digital technologies facilitate the implementation of collective rules because they enable to track more easily individual behaviors, because rules can be implemented into the code, because the ultimate retaliation — exclusion from the community — is technically easy and cheap to manage.

C) How ICTs Challenge Traditional Institutional frameworks

Nonetheless, digital technologies favor the implementation of self-regulations, but digital networks make traditional institutional frameworks less effective. Internet is a-territorial by nature, while traditional public regulations are implemented on a territorial basis. Internet's interconnection ability is the basis of its ability to support the sharing of communication capabilities and contents. Its decentralization guarantees its reliability, its efficiency and its ability to develop. Internet is therefore the support of a worldwide connectivity that overwhelms existing regulations based on territorial jurisdiction and Government's legitimacy. Two evolutions play. First, digital networks allow bypassing nation-state based regulatory frameworks. Second, the legitimacy (and the efficiency) of these previous frameworks is in question due to the properties of the new technological infrastructure. These evolutions concern both the rights to access and use information and networks, and the norms used by agents to coordinate many dimensions of societal interactions, and in particular those that organize the use and exchange of economic resources.

First, any legislation can be bypassed through the Internet because no governmental agency would be able to efficiently supervise the exchanges of information among Internet users under their jurisdiction and between them and foreign third parties to guarantee the enforcement of existing laws. Moreover these exchanges can be faked, and the potential infringers of the law can use a wide set of technical means to perform operations that would be forbidden by some technical means operated by the state⁶. The generalized interconnectivity as well as the possibility to break codes, and reciprocally to strongly encrypt limits the ability of Governments to control network-based activities⁷. In practice, this ability

⁶ Individually sat-up property rights and private regulations based on codes can also be cracked by hackers and bypassed, this is discussed in the next section

⁷ The governments could try to control information flows by creating "national internet". It would, however, result in wide losses of positive network externalities. Moreover, it would necessitate the ability to effectively forbid any uncontrolled interconnection with a foreign network to avoid creating a gateway. Moreover, having the government scanning the details of private uses of information might violate citizen's privacy and might be a threat toward civil liberties. That said, since Sept. 11th 2001, governments try to rely on Internet Services

to bypass traditional public regulations does not result in massive development of illegal activities in all domains; even if cyber-crime develops, and if some practices like files sharing raise major concerns in some domains, like cultural industries. It however gift many stakeholders with bargaining power enabling them to claim for the reshaping of many legislations either because they consider the existing one as no longer tailored to the problems they are supposed to solve, or because existing national orders result in handicap in the global competition taking place in the digital space. It results in a direct confrontation and a brakeless competition among norms in many domains, which is reinforced by the ability of services providers and contents providers to locate their information processing devices in territories where the norms that are the most in accordance with their preferences apply⁸.

Second, the legitimacy and the efficiency of traditional regulations are also in question. Some features of traditional institutional frameworks are no longer justified because the new technological infrastructure renews the economics of information and many of the optimal tradeoffs behind the current regulatory framework. In some cases this is the principle of State regulation which is challenged per se, in other cases it is the way public intervention was designed that is no longer relevant because the problems they addressed change with the new technologies. Let us quote two sets of examples.

First, the traditional governmental intervention in the design of intellectual property rights (IPRs) systems was largely justified because physical constraint was in last resort the only way to really prevent unentitled agents to access and use information. Producers of knowledge and information had to rely on public authorities acting as their agents to guarantee the effectiveness of their exclusive rights of use. The resulting design of a unified regime of IPRs whatever the technical domain and the industry had however strong costs of maladaptation (Eric Brousseau and Emmanuel Raynaud, 2005; Eric Brousseau and Christian Bessy, 2005). Indeed, to be implemented by a central government, a rule — for instance, of duration and scope of protection — has to be generic to be applied to a wide set of situations, resulting in lack of effectiveness or efficiency in many specific situations (the optimal delay of disclosure being for instance different in a fast evolving and in stable technological domains). Thanks to the ability to implement self-enforced IPRs, digital technologies allow content creators and innovators to decide of the optimal rules of diffusion/protection to be applied given the specificity of what they produce, the technological and competitive context, the business model they want to implement.

In addition, IPRs were designed at the national level because for a long time it was the relevant economics space, and because an authority of last resort was available at this level only. Today the economics space is increasingly global and the same is true for the information space. In many respect it is meaningless to guarantee exclusive rights of use over information in some territories and not in others. Since digital technologies enable to make effective exclusive rights of uses wherever the information is used, the usefulness of national

Providers (ISPs) to better track end-users or deny access to some servers. There is however an irreducible difficulty to control and end-to-end network.

⁸ This destabilizes existing legal frameworks, despite the fact that international conventions could be set up to implement common legal principles. On the one hand, inter-governmental regulations are submitted to a prisoner dilemma. To stimulate their national economies some States can decide not to ratify these conventions, thus bounding their impact (digital paradises). On the other hand, the capacity to agree on common norms is quite difficult because the various legal systems result from contrasted historical and philosophical traditions, which bring us back to divergent ideologies about human nature, social logic, or economic activity.

IPRs systems decreases.

Second, the new technological context affects the logic of the design of former rules. For instance, many regulations of the diffusion of information (e.g. restrictions or ban of certain contents, organization of specific distribution channels, etc.) were justified because traditional broadcasting technologies — in particular hertzian analog radio and TV — made impossible to control access to information. Because they allow controlling access to contents on a customized basis (i.e. user by user, digital technologies turn many traditional regulations restricting publication rights and channeling contents into obsolete tools.

In the same spirit, digital networks overwhelm the traditional boundaries and the implementability of communication (one-to-one) versus broadcasting (one-to-many) regulations. Most information services are hybrids between these two extremes, and, even, invent new logics for sharing and exchanging information.

The former national regulations are no longer relevant because agents have now the possibility to decentrally implement more efficient orders settled within communities characterized by common practices or preferences rather than by location or jurisdiction. Is a new institutional framework needed then? Some authors argue that information and digital resources are almost pure indivisible and non-rival goods that make useless the implementation of common rules since these rules will be spontaneously and decentrally produced by agents and communities implementing self-enforcing property rights and rules. If a resource does not cause conflicting claims among its potential users, scarcity does not arise and there are no economic problems. There are however generic (2) and specific (3) arguments to justify some central coordination of the rule making and enforcement process in the digital world.

2. The Economics of Multi-Level Governance

To better understand how rule settlement can be optimally organized it is useful to rely on the economics of constitutional design and multilevel governance which seeks to better understand at what “level” of coordination should different types of coordination problems be solved, so as to understand what is the optimal way of organizing an institutional framework⁹.

The New-Institutional Approach to Property Rights provided by Yoram Barzel (1989) and Douglass North (1990) is a useful framework to deal with this issue. In a given group — let say a Nation — the measure and the enforcement of property rights can be performed either centrally by an authority of last resort — generally the State, that benefit from the monopoly

⁹ As pointed out by Liebet Hooghe and Garry Marks [2001], the notion of multi-level governance — together with others like multi-tiered governance, polycentric governance, multi-perspectival governance, FOCJ (functional, overlapping, competing jurisdictions, etc. — seeks to describe how governance has been changing in western societies. All refer to the dispersion of authority away from central government, upwards to the supranational level, downwards to subnational jurisdictions, and sideways to public/private networks. Two bodies of economics literature have investigated these notions in particular. Neoclassical political economists and public choice theorists (e.g. Elinor Ostrom and James Walker, 1997; James Rosenau, 2001) insist on the idea that governance result from the setting of dispersed self-rule on the part of diverse voluntary groups that overlaps and interact in a complex way among each other and with imperfect markets and imperfect public-interest seeking institutions. Theoreticians of (fiscal) federalism moved from studies focused primarily on formal constitutional federations, to a costs/benefits analysis of centralization vs. decentralization of authority (e.g. Wallace Oates, 1972, 1999).

of the legitimate violence — or decentrally by the agents. In the former case, the Government defines for each set of economic resources the rights that can be associated to them (e.g. *usus*, *fructus* and *abusus*) and maintain a cadastre in which each of these rights on any resource is recognized to individuals or groups. Then the government sets up and operates an enforcement mechanism to expel any unentitled agents from the protected use of these resources. It can be an *ex-ante* mechanism — e.g. a guard or an encryption mechanism that forbids access — or an *ex-post* mechanism that assesses violation and punishes infringers. The alternative is to have the property rights self-delineated and self-enforced by agents. In this later case, individuals (or groups) claim for exclusiveness of usage, and they use available means (and in last resort violence) to have their claims enforced by third parts.

The NIE approach to property rights analyzes the advantages and disadvantages of centralization and decentralization (Yoram Barzel, 1989; Douglass North, 1990; Eric Brousseau and Mhand Fares, 2000; Eric Brousseau and Emmanuel Raynaud, 2005; see also Eric Brousseau, 2004, and Eric Brousseau and Christian Bessy, 2005, in the specific case of IPRs). It leads to the idea that setting a PRs system, either fully centrally or fully decentrally, would be inefficient in the sense that the costs of setting a complete PRs system¹⁰ would be too high as compared to the benefit agents would get in being able to use resources, invest in the genesis of production capabilities, and to organize trade. Any property right system results therefore from a trade-off between the advantages of centralization and decentralization.

In a recent paper Eric Brousseau and Emmanuel Raynaud (2005) point out the main “factors” playing a role in the tradeoff enabling to identify the optimal level/mode of coordination to solve a given coordination problem in a specific context. On the one hand, centralization provides agents with (i) scale and scope effects. ii) learning and specialization benefits, and (iii) means to reduce losses of collective welfare (by allowing an increased consistency among local rules, an internalization of externalities, the genesis of positive network effects due to the use of common standards of interactions). Indeed, the entity in charge of centrally designing a rule for a community will take into account the interdependencies among agents and the net benefit of alternative rules at the collective level, while decentralized negotiations could fail to consider these element if transaction costs are not zero, if information asymmetries arise, if property rights are incomplete, etc. On the other hand, centralization generates inefficiencies due to (a) static mal-adaptation¹¹ (linked to the increasing heterogeneity of individual preferences). b) dynamic mal-adaptation (due to the reduced renegotiability of collective rules and therefore the difficulty to adapt compromises to new circumstances). c) to the increasing enforcement requirements (since there are increasing incentives to free ride due to the rising maladaptation costs inherent to a larger, less homogeneous, community. and (d) to the raising private capture of coordination. Indeed,

¹⁰ Completeness of property rights corresponds to an ideal. It would indeed means that any potential use of any resources would be identified and associated to a right granted to either an individual or a group. A complete PRs system would enable almost costless transactions since agents would only have to bear the cost of meeting and agreeing on the terms of the exchange. Transaction would not be free, however, because the costs of the property right system would have to be covered, but once established variable transaction costs would be extremely low (limited to information and negotiation costs).

¹¹ Maladaption costs stand for the opportunity costs born by an agent when, to coordinate with others, he relies on a rule that is not the one that would result in the best net outcome for him as compared to the most advantageous available solutions. Agents might be led to accept coordination solutions that do not minimize their private transaction costs because when interacting with other agents and in particular with communities, collective constraints and/or asymmetries in bargaining power can lead a single agent to accept rules that do not fit perfectly to its particular needs and individual preferences.

when an order is both general and centrally designed, those interests that can influence the design of the order have strong incentives to distort collective governance in their favor. First it is profitable since the order apply to a wide set of agents. Second, it is efficient because agents can hardly escape this rent extraction (since the order is general, agents have few exit options).

This tradeoff that is inherent to the solving of any coordination problem makes it clear that there is no “optimal” rule making solution/level that annihilate the cost of coordinating to use economic resources. Agents therefore play on complementarities among level/modes of coordination to try to minimize the coordination costs they bear (and maximize their efficiency in using and exchanging economics resources).

First, agents have to organize a “division of labor” among the various tools they can rely on to coordinate: general institutions, community ones and contracts. To do so, they divide actual coordination problems into several ones to be solved by the level/mode of coordination that minimize their private costs. Here a principle of “subsidiarity” applies. The relevant level of coordination has to fit with “generality” of the addressed issue that can concern a pair of agents, a subset of the population or to the whole population. Agents build complementary contractual arrangements, self-regulations and general institutions to solve the various dimensions of their coordination problems in function of the optimal centralization/decentralization tradeoff for each of these dimensions.

Second, each level/mode of governance potentially generates inefficiencies. Complementarities among them should also be considered in terms of interactions. A “check and balance” principle has to be managed among the various level of governance, and in particular between general and mandatory institutions and local (or specialized) and voluntary ones¹². The former — qualified as public institutions in our framework — should (i) control for monopoly capture by the later — qualified as private institutions —, and (ii) be used to reinforce the bounded enforcing capabilities of private institutions since the later are sometimes unable to implement and make enforced an efficient private order (which, usually, cannot rely on violence to incite agents to comply). On the other hand, private institutions and governance mechanisms are useful in (a) allowing innovation in the institutional framework, and in (b) limiting the discretionary power of those in control of public institutions. Their ability to bypass and even overcome the public order, constrains public institutions not to be too inefficient.

These elements call for a multilevel governance of any coordination problem, which should apply in the digital world as well. One of the characteristics of any multilevel governance is that a last resort regulating entity should overhang all the norm settling entities; just as a Supreme Court does in a constitutional State. The role of such a last resort entity is to enhance the efficiency of the global order resulting from the decentralized production of norms. It is in charge to avoid incompatibilities among norms, and to maximize positive network externalities among them, and to avoid capture of norms by individual or groups seeking to

¹² In our framework, public institutions are the results of an evolutionary process of extension of the scope and rigidification of contractual arrangements, then collective self regulations, that start by applying to small groups and specific coordination issues to expand to wider groups and to the solving of more generic coordination problems. By reference to the notion of Institutional Framework defined by Yoram Barzel [1989] and Douglass North [1990], Public institutions, are mandatory — agents do not choose to enforce the related rules — and general — the associated rules apply to wide and heterogeneous sets of situations and agents. Private institutions are voluntary and specialized

exercise dominance. It is also responsible for guaranteeing the enforcement of locally settled orders as long as they contribute to collective efficiency¹³. At the national level, the (federal) state, and in particular the Supreme Court, are these last resort regulators overhanging local government orders and private orders settlers. At the international level, due to the increasing globalization of the economy, but also of many other aspects of collective problems — in particular environmental and security ones —, there is a necessity for the emergence of such last resort regulating entities responsible for harmonizing and controlling the interacting orders resulting from the decentralized initiatives of national public systems (i.e. national states) and private entities that are settling international orders in many domains: business, technology, culture, politics.

3. Institutional Stakes in the Digital Sphere

While strong arguments call for a decentralized settlement of IPRs and collective rules in the digital world (section 1. we just reviewed general arguments (section 2) leading to mitigate this initial view. A certain degree of centralization is useful. This general statement is reinforced in the digital world because digital networks and digital activities impacts on the provision of two categories of essential resources. First, the IPRs regime and the collective rules organizing access and use of information goods directly influence on the efficiency with which information and knowledge can be used, shared and produced. Second, digital networks are *per se* resources allowing coordination among agents. There are two levels of understanding for this assertion. Digital networks are communication capabilities allowing agents to get in touch, exchange information etc. In addition, end-to-end networks provide agents with the capability of creating private orders to manage access-to and use-of information and coordination resources. Thus, the regulation of digital networks affects both on the ability to collectively produce and use information and knowledge, and on the capability to produce/use relevant and efficient inter-individual coordination platforms. It is essential to assess whether a fully decentralized production of the institutional frameworks regulating the access and use to these essential resources would be efficient.

We will start by pointing out that the efficiency of measurement (A) and enforcement (B) operations could be enhanced thanks to some centralization, because a full decentralization would lead to inefficiencies. Then we will show that these arguments are reinforced by the sustainability of monopolies in the digital world (C).

A. Can measurement operations be totally decentralized?

The way according to which property rights and collective rules are set on digital networks affects the efficiency of the use of rival resources and non-rival resources. Eric Brousseau (2004) details why, in both cases, full decentralization generates inefficiencies¹⁴. We will

¹³ There is therefore convergence of interests between central and local norm settlers. The central norms settler can facilitate the role of local norm settlers in strengthening their ability to implement their norms. The local norm settlers can, in turn, accept the constraints imposed by the last resort regulator in exchange of this support. Such potential bargain allows both levels of regulation to reinforce each other, since the local regulators recognize the legitimacy of the (collective) constraints imposed by the last order regulator, while this later recognizes the contribution of the local norm settlers to the implementation of an efficient general order.

¹⁴ As far as it concerns measurement operations resources, the main problem with rival resources is the way the initial endowment of property rights is performed. It can generate non-neutral wealth distribution effects. It can also lead to illegitimate capture when the rights granted on digital networks impact on rights that were granted

concentrate here and in the following section on the most strategic issue: non-rival resources.

Concerning non-rival resources, the limit of decentralized setting of property rights is an excessive protection of these resources, forbidding access to many potential users, while the resource is non-rival. On the one hand, it is today possible to self-claim exclusive right of use over digitized information and knowledge (e.g. embedded in a software. simply by encrypting it. It is also possible to control access to information spaces providing coordination resources. On the other hand, both type of resources are non-rival (if there is no congestion effect within the information space, in the later case) and there are important collective benefits to organize free access to these resources.

- In the case of information and knowledge, there are spillovers. Maximizing diffusion allow to maximize the production of new information and new knowledge because of the possible recombination of the existing stock, and because the ability to use a specific set of information or knowledge often depends upon the access to complementary information. A central system guaranteeing some fundamentals right of access to information should be able to guarantee the exploitation of these externalities.
- In the case of coordination platforms, the ability to create customized and efficient coordination means relies on access to an open platform on which tools to create those means are available. Moreover, the openness of coordination platforms maximizes for each member the number of potential counterparts in the exchange (whether exchange is of a market type or not). It then reinforces the chances of any transactor to get in touch with the right counterpart. It reduces also the ability of those participating to a platform to capture monopoly rents on other members, and incite them to enhance efficiency, and allow deepening the division of labor. Again, a central system guaranteeing the openness of (generic and more specific¹⁵) coordination platform is essential to maximize the likelihood to exploit these externalities.

It has to be pointed out that in the former institutional frameworks organized at the national level, the Government often acted to limit private capture of resources considered as essential facilities. Think for instance to the IPRs system with the obligation of disclosure and with the process of transferring private property to the public domain with the passing of time. Think also to the competition policies aimed at guaranteeing access to exchange platforms.

These argument calls for some centrality, both to select the collectively optimal system, and to compensate those who are harmed by a system in which PRs are bounded as compared to

outside from them. As far as it concerns enforcement, full decentralization leads to not benefit from potential efficiency gains linked to centralization; in particular the ability to manage externalities and the ability to benefit of economies of scale and scope (see Eric Brousseau, 2004; and also Eric Brousseau and Emmanuel Raynaud, 2005) or the former section in this chapter that remind the general trade-off between the two way of setting orders).

¹⁵ There are indeed two stakes. First openness of the network infrastructure and services in which these platforms are grounded is essential. Put another way, the Internet infrastructure, architecture and essential resources should remain open. Second, the platforms built by communities of all kind of the Internet should remain open. More precisely, access to them should be guaranteed in fair conditions to avoid the development of oligopolies or oligopsonies purely aimed at capturing rents. About the first point, see the note on The Internet Transparency. RFC-2775: <ftp://ftp.rfc-editor.org/in-notes/rfc2775.txt> / Blumenthal M. S. & Clark D.D. (2001. "Rethinking the design of the Internet: The end-to-end arguments vs. the brave new world", in B. Compaine and S. Greenstein (eds) *Communications Policy in Transition: The Internet and Beyond*, MIT Press, Sept. (http://www.ana.lcs.mit.edu/anaweb/PDF/Rethinking_2001.pdf)

what they would get if a system of unlimited rights to control access and uses would prevail.

B. The limits to a fully decentralized enforcement

Assuming that the above mentioned measurement problems have been solved, a too decentralized enforcement of PRs and self-regulation could lead to an inefficient protection of non-rival resources and generally speaking to a too weak enforcement of private orders, depriving agents from respectively an efficient protection of their exclusive rights of use (or of remuneration) and of the benefits to rely on decentrally set-up coordination means.

Self-enforcement in the digital world relies on two pillars: code and control of access to information spaces. However, none of these methods guarantees a perfect enforcement. First, no cryptographic system is inviolable. Code based protection is therefore imperfect. Second, the enforceability of norms founding virtual communities is also in question. The power of coordinators of virtual communities is obviously bounded by the ability of Internet users to access alternative communities providing them with the same type of service (or alternative one they prefer. and by the ability of the providers of means of access to identify the users (because the only identity that is certain over the Internet is that of the computers). These calls for an entity able to guarantee enforcement in last resort by being able to punish infringes. In that case, centralization of enforcement is justified for two reasons¹⁶. There is obviously a need for some exercise of constraint in last resort. Indeed even if a self or local regulatory mechanism can rely on its capability to exclude infringers, its credibility is bounded by the cost born by the infringers in case of exclusion. If this cost is inferior to the benefit an agent can make by violating the local regulation, the self-enforcement mechanism will be unable to prevent (major) infringements. A last resort enforcement device that would be able to increase the costs of violating the local regulation by implementing additional retaliation would reinforce the enforceability of local regulation (see Paul Milgrom et alii, 1990; Mark Lemley 1999; Eric Brousseau and Mhand Fares, 2000; Eric Brousseau and Emmanuel Raynaud 2005). In addition, a central mechanism granted with power of constraint could guarantee a minimum transparency to control how the closed information spaces are actually used. Indeed, a virtual community can be organized to infringe the rights or break the rules established by another on-line community. More generally, if agents agree on principles that allow them at a collective level to maximize efficiency — e.g. by optimally dealing with the protection/diffusion dilemma (see Stanley Besen and Leo Raskind, 1991) —, some of them could use ITs and digital networks to create sub-spaces where these common rules would be violated. These sub-spaces could be of very different types: P2P communities to bypass the right of remuneration of creators of content, market places to by-pass regulations of market exchanges, private network built on the digital infrastructure to manage communication flow a different way (e.g. to manage priority for voice or video streams). Bypassing collective rules can ruin their sustainability. This is true for whatever type of rules ensuring the provision of a public good to a community, whatever this public good is: an open access platforms, open access information or knowledge. For instance, collective agreement on remuneration rights to be allocated to the creators or inventors could be hindered by the development of communities faking their sharing of contents¹⁷. In other cases, the sharing of information

¹⁶ Central enforcement, in turn, calls for some centralization of measurement. Indeed, central supervision of uses implies at least a mechanism that will register claims of exclusive rights of uses over information — implying a categorization of the various types of material eligible for protection — and that will check for the legitimacy and the absence of overlap among these claims.

¹⁷ Two scenarios could then arise. Either the creator of contents will reduce their investments in creation. Or,

within OSS communities could be discouraged by private capture of knowledge and the associated wealth and reputation by some free riders. Some ability to have collective rules enforced in last resort is therefore needed to avoid phenomena comparable to the tragedy of the commons, the commons being in that case the collective rules that “optimally” solve the protection/open access dilemma in the provision of public good.

C. Sustainable monopolies in the digital era

The problems rose by a full decentralization of the settlement of property rights and regulation are reinforced by the long-term sustainability of monopolies in the digital world. First fixed costs make monopolies stable and viable in the digital world (Carl Shapiro and Hal Varian, 1999; Thomas Noe and Geoffrey Parker, 2000). Second, network externalities are also strong drivers of monopoly dominance through the possible privatization of (interface and interoperation) standards. Network effects push for interoperability among the different components of the digital sphere. Players are incited to take control of the interface and interoperability standards because they are essential means to control access to various markets. They therefore play on increasing returns of adoption and viral contagion to reinforce their ability to control the long-term evolution of standards and therefore of markets structures¹⁸. The combination of the two allows some players or some coalitions to gain control over the ability to settle the basis of property rights systems and collective coordination means, so as to have their interests prevailing without really allowing alternative interests to compete on a fair basis, which should harm collective welfare.

We explained above that a PRs system based on self-claims and self-enforcement could lead to an excessive private capture of non-rival resource as information and knowledge or as coordination platforms. Producers of these public good will indeed be incited to fully and endlessly restrict access, while collective efficiency call for limited exclusion in the short run and full openness in the long run, to allow creators/producer to be remunerated while maximizing diffusion and access. The impact of digital technologies on market structure make sustainable in the long run this over-restriction of access to information, knowledge and coordination means, leading to an under-optimal availability of these public goods both in the short and long run. Never-ending restricted access to public goods would have strong redistribution effects since some players would be able to endlessly capture rents. Second, it can have strong negative collective effect such as hindering innovation (because of restricted entry and because of reduced spill-over effects) and fragmenting the open-platform of coordination, resulting in making impossible valuable deals.

These threats lead to the necessity to bind the ability of economic agents to restrict access to contents and coordination platforms. This leads to limit the encryption capacities of agents (e.g. mandatory registration of code keys to trustworthy third parties) to maintain a minimal

since investors in the creation of digital sequences could fear to not get any return if disclosing them, and since they can cheaply control access to them, it should result into a private overprotection; in the sense that the collectivity will be deprived from the potential positive externalities of open access (externalities of diffusion, spill-overs, etc.).

¹⁸ Digital goods are composite goods made of the assembling of several components (Nicholas Economides and Steven Salop, 1992; Nicholas Economides, 1996; Eric Brousseau and Thierry Pénard, 2005). In such a context, if standards are not fully open, agents are bounded in their ability to assemble and locked-in into some specific relationship with a restricted set of suppliers, who play on switching costs to be able to capture rents in the long run.

level of transparency aimed at enabling supervision by some antitrust authority. Moreover, reducing encryption capabilities limits de facto the levels of barriers to entry and therefore the strength of monopoly power. More generally, self-enforcement has to be supervised by some last resort authority to ensure that encryption and self-regulation are not combined to develop and exercise monopoly power, and to guarantee open competition in the long run¹⁹. Indeed competition is the best solution to provide agents and communities with incentives to implement efficient solutions.

The openness of coordination platforms should also be maintained. We mentioned above that the end-to-end connectivity provides the agents with the ability to implement self-regulations in the digital world. It provides, for instance, Internet Services Providers (ISPs) with the ability to manage their network the way they want, including by implementing specific standards, specific addressing systems, etc. Depending on whether the ISP comply or not with the Internet standards and with the Internet management principles, the ISP makes of his network a part of the Internet or a specific network, which is connected to the Internet by a gateway controlled by the ISP. This later solution aimed at increasing (local) quality — e.g. by managing priorities within digital flows or by reducing the scarcities of IP addresses — strongly decreases the transparency and the reliability of the network (because communication protocols becomes partly incompatible, because the addressing system is then composed of various non transparent layers, etc.). Moreover, it gives a wide power of control to ISPs because the network is no longer of an end-to-end type. In case of generalization of such a behavior, the automatic interoperability among networks would disappear and ISPs would have to negotiate interconnection agreements and manage gateways among their networks. This would lead them to define what their users can do when they are interacting with users of other networks (by authorizing or forbidding various practices). Put another way, with the collapse of the end-to-end principle, network operators would become able to control the information service provision on their networks. They would therefore be tempted to adopt strategies aimed at decreasing the competitive advantages of their competitors (either by forbidding access and downgrading the quality/price ratio of competitors' services, or by providing exclusive services on their own network). Such strategies would lead in the long run to the emergence of un-contestable monopolies, but they would also lead in the short term into a decreasing ability of information and coordination service providers to market their services on the global infrastructure (with unavoidable consequences on the diversity and on the price benefiting the final users, since providers will have to write off the fixed cost of the service provision on a reduced audience). These would have strong distribution effects and would harm innovation. Thus, without constitutional principles guaranteeing the protection of some fundamental rights to the users of the Internet and without antitrust policies aimed at maintaining a sufficient level of contestability, public goods that are provided on an open basis may simply disappear; which is a fundamental concern when the public goods are the infrastructure of which additional public goods are provided (together with private goods).

¹⁹ In that respect, it has to be pointed out that there is a strong transparency-security dilemma over the Internet. On the one hand, the long-term sustainability of the competitive process in information networks calls for a minimum level of transparency. This is essential to enable users to compare alternative supply conditions. This is also crucial for supervising potential anti-competitive behaviors. On the other hand, the protection of contents (both the privacy of information exchanges and property rights) leads to encryption. This raises complex problems, because even if it is not justified to broadcast publicly the content of all information exchanges, it is necessary to verify that information exchanges are not harmful for the collectivity as could be the case if they were aimed at settling collusive agreements, infringing intellectual property rights or performing criminal activities.

Through this example, it is clear that it is essential to guarantee in the digital economy the end-to-end character of the Internet that is at the heart of its reliability and flexibility. More generally, there is a tension between the individual ability to implement local specialized orders and the necessity to preserve some common coordination means. It is therefore obvious that the later need call for binding the ability of local regulators to implement their preferred orders.

4. Optimal vs. Actual Governance Mechanisms

To sum up, digital technologies challenge the efficiency of the existing institutional framework, based on interactions among public and private norm settlers under the control of public national authorities. ICTs empower all kind of communities by providing them with tools allowing implementing at a relatively low costs collective orders, which can be built behind, beside, or above the existing public orders built by national states. One of the interests of the Internet is precisely its ability to structure communities emancipated from previous institutional framework or geographical constraints (while it does not mean that communities defined on pre-existing jurisdiction or geographical basis are not relevant when it comes to regulating located practices and problems). The decrease of enforcement costs allows building self-enforceable regulations at a larger scale than before, whose sole boundaries is the minimal consistency of communities (whose members should share values and preferences). The second main advantage of Internet and related technologies is that codes allow a strong customization of the management of rights of access and uses, reducing maladaptation costs born by agents in the pre-existing institutional frameworks. Finally, yet importantly, the ability of individuals and communities to self-organize and to design innovating coordination processes is a strong source of technical, organizational and institutional innovation. A coordination of these practices is nevertheless unavoidable to guarantee the efficiency, consistency and sustainability of this ability to implement innovative coordination solutions adapted to economic agents' needs.

A full decentralization of the design of the regulatory framework would lead to an excessive privatization of information and coordination platforms that would harm collective welfare because it would deprive the society from access to non-rival resources. In addition, the fragmentation of the Internet and of the information space would reduce the opportunity to coordinate efficiently. These call for a last resort authority aimed at bounding the power of norm settlers to force them to provide access to their resources (disclosure rules, open access obligations, bounded encryption capabilities, etc.). In the same time, the last resort enforcer should guarantee the norm settlers with a reinforced enforceability of the rules they set (as long as they do not infringe some superior constitutional principles). Digital enforcement mechanisms being subject to bypass, especially if encryption capabilities are bounded, local norms could be subject to a too high violation rate, ruining the capability of communities to implement efficient collective orders adapted to various specific situations and preferences.

It has to be made clear that the questions raised by the Internet are not only linked to the fact that digital technologies overwhelm the traditional trade-off between self-implemented orders and State's authority based orders. It has also to do with the global nature of the end-to-end network, which result in an absence of arbitrator in last resort. The stake is not only fixing the issues raised by the proliferation of self-regulations. More generally, it is dealing with the proliferation of orders. While the technology is empowering private norm settlers, the orders built by National States are still in force. First, as long as the interactions that are regulated on digital networks still have a material and therefore a located dimension, National States can

affect them. Second, even for fully digitized operations, National States can try to force the users of the Internet to enforce their legislation. They try to do so in particular by threatening Internet Services Providers to suit them if these later do not make National legislation enforceable for the local users. Moreover, for many citizens, National States are remaining essential legitimate regulators, expected to provide them with security and protection of some fundamental rights (and at least defense against economic dominance). In addition, while national governments often fail to coordinate, because they have conflicting interests, convergences may exist. In such cases — like network security — national states really have an ability to impose an order²⁰. Consequently, while the initiators of private orders can bypass the traditional providers of public orders, the former still have the ability to implement some orders and to influence the private orders that eventually attempt to bypass them. It remains true, however, that this ability is bounded. The current situation is therefore neither characterized by the disappearance of public regulations, nor by the perpetuation of the traditional state regulation organized at the national level and associated to intergovernmental coordination at the international level, but by the proliferations of orders implemented either by State or non-State actors both at the infra and supra national levels. Indeed private institutions either local or global settle various types of self-regulations in parallel with efforts made by local and national governments together with inter-governmental organizations. The noticeable characteristic of the current situation is that there is not established hierarchy among these orders. None of them is able to impose itself to the others in the sense that the norms of the “hierarchically inferior” orders would have to comply with those of a “supreme” one.

The need for central coordination results neither in the need for traditional direct State intervention²¹, nor in the need for centrally designed regulations. The economics of multi-level governance calls for a federal institutional model enforcing a subsidiarity principle. A central and last resort device should overhang the decentralized, multilevel and multi-type process of norms implementation. Its role will not be to set-up norms, but rather to settle conflicts among norms decentrally implemented in order to guarantee, in particular, a minimum level of consistency among orders and their conformity with basic constitutional principles aimed at implementing most efficient solutions by taking into account interdependencies and the interests of the wider possible set of stakeholders and at guaranteeing access to essential public goods.

Beyond its logical justification, the implementation of a regulator of last resort is made possible by the necessity to centrally manage the addressing system of the Internet. The mastering of the management of the addressing system by the entity that would be responsible for the regulation in the last resort will allow this entity to dispose of the means of its assignment. Indeed, it would enable it to dispose of a credible threat of excluding agents from the access to the cyber-world that it could use to have its decisions and regulations respected. In turn, only a well-designed entity should be allowed to control the system of inclusion/expulsion from the Internet.

There are however problems rose by the above conclusion drawn from the theory. How this

²⁰ In practice, a coalition of the most powerful national government is sufficient. G8 members, backed by the leading emerging countries (China, India, Brazil) have enough influence to convince most national governments to follow them. Regional unions or alliances are also used to leverage the bargaining power of these Nation-states dominating the International scene.

²¹ In any case, there is neither global government, nor adequate intergovernmental agency.

authority of last resort should be constituted and implemented. In a sense, it should be in the same time the Constituent Assembly and the Supreme Court of a global “cyber republic”, since it should set-up the constitutional principles and implement them. However, such a body cannot be instituted in the absence of an entity like a global government, or of a recognized concept of global citizenship, or of accepted processes to elect global representatives? In any case, the way the present regulation of the Internet is designed and implemented does not fit at all with these principles.

Presently, embryos of several alternative regulatory frameworks develop in parallel with the development of an international debate on the needed institutional framework to govern and regulate digital networks (and the information and knowledge based society). To a certain extent, the developing solutions are complementary since they do not address exactly the same issues. Several organizations emerged in the 1990’s to carry on the technical regulation of the Internet, while more recently international forums were established to discuss the economic, political and societal aspects of the regulation of the Internet. On the one hand, the former organizations could become the technical administrators of the Internet in charge of implementing the principles resulting from the “political” debates. On the other hand, these organizations and forums can be considered as resulting from alternative visions of the way the Internet and information activities should be regulated: namely, on a unilateral or multi-lateral basis. The Internet being the result of the efforts of the US Federal Government, this later decided to delegate the technical governance of what was becoming a global network to a new type of agency, which model had to be invented, but which should be neither an inter-governmental organization, nor an agency emanating from the United Nations. This led to the foundation of ICANN in 1998. The same year, the UN and its agencies, in particular the ITU²², launched a process aimed at implementing a multi-lateral system to govern the Internet grounded in international treaties.

The ICANN (*Internet Corporation for Assigned Names and Numbers*; www.icann.org) the organization currently in charge of “governing” the addressing system of the Internet is the core of the US unilateral strategy. It already plays a central role. By being responsible for distributing IP numbers and Domain Names, ICANN controls *de facto* the inclusion and the exclusion from the Internet. ICANN draws from a tumultuous process of creation²³ and evolution. With the development of the commercial Internet and its internationalization,

²²Headquartered in Geneva, the International Telecommunication Union (www.itu.int) is an international organization within the United Nations System. It was established in 1865 to facilitate international interconnection of telegraphy, and is a unique partnership of industry — formerly the national telecommunications monopolies — and governments. The ITU develops mutually agreed non-binding recommendations aimed at enabling the interconnection and interoperability among telecommunication networks, which are based on rules of interoperation (and numbering) and common standards (formerly performed by the CCITT, now called ITU-T)

²³ Taking into account the enlargement of the Internet, the scientists that greatly contributed to its design and development — especially Vint Cerf and Robert Kahn — funded the *Internet Society* (ISOC) in 1992. This non-profit organization aimed at managing the Internet by taking into account the interests of all its stakeholders. The IETF and the IAB thus became components of ISOC. Initially ISOC was supposed to manage both the standards and the addressing system of the Internet. However, policy makers and industry lobbies denied the legitimacy of this new organization to manage the DNS. Because ISOC was supposed to be controlled by US computer scientists, these circles estimated that it was not able to take into account either the interests of non-US citizens, foreign Governments, and those of the industry, especially the owners of intellectual title deeds (especially trademarks and brands). This led to the foundation of ICANN in 1998, as a compromise between historical Internet community and new stakeholders (governments, business community). A MoU signed with the US government established its mandate.

numerous groups of interests pushed for the emergence of an organization that would involve all the stakeholders of the Internet. ICANN managed to include most of them. ICANN's members can therefore be either public or private organizations involved in the development or the uses of the Internet, government and public agencies, and individuals ("netizens"). Ad hoc committees group these various communities and there are complex processes of election and nomination in a wide number of committees responsible for the various domains dealt with by ICANN. In addition, ICANN coordinate with several other organizations in charge of related issues, as the World Intellectual Property Organization (WIPO) or the Internet Engineering Task Force (IETF). Figure 1 synthesizes the complex web of committees and cooperative relationships.

Insert Figure 1 here

The main weaknesses of the present ICANN are:

- First, the legitimacy of each member is not at all guaranteed by any accreditation process. Moreover, the relationships (and the hierarchy) among the various types of members are unclear. This results in an organization that does not guarantee that the interests of the various stakeholders are taken into account and hierarchized, nor that its decision will be consistent, nor that it can even make decision. Figure 1 illustrates well the highly complex organization of the current ICANN. Among other things, it shows clearly that the various categories of stakeholders are not equally considered in the decision process. Commercial interest, and in particular those of the dominant corporation in the digital industries, are clearly overweighed as compared to citizens and even to the (non-US) Governments.
- Second, it is not autonomous since ICANN is a contractor of the US Government. Moreover the contract between the US Government and ICANN is only transitory, and the technical implementation of the DNS (and therefore ICANN's decisions) is ensured by another contractor of the US Government: Verisign. As a result, ICANN is neither an independent organization, nor a strong one. It is presently not autonomous and the institutions responsible for the enforcement of ICANN's rules in the last resort (the US courts and the US Government) cannot be considered as fully legitimate, since their purpose is to protect the interests of US citizens and people, they cannot impartially protect the interests of all the stakeholders of the Internet²⁴.

Given its dependence of the US Government, its lack of actual authority, and its fuzzy way to take into account and balance the various interests of the stakeholders, ICANN's legitimacy is often challenged when it is question of transforming it into the instance responsible in last resort of the regulation of the Internet. Because of the low will of the US Government to let it become a multilateral entity, a coalition of the UN, of many national Governments and of many NGOs agreed to launch an initiative aimed at (re)founding the principles of the governance of the information society. This led to the World Summit on the Information

²⁴ The US Department of Commerce holds a lot of power. He remains the owner of the addressing system. Thanks to the contracts with Verisign, he is able to de facto veto ICANN's decision, since Verisign implements these decisions only after approval by the US DoC. Third, the US DoC continue to directly control several top-level domain names. Fourth, the DoC owns 10 of the world's 13 root servers, the computers that store files of the domain names. That said, the US influence is not only due to the power of the government, but draws also from the involvement — which requires significant dedicated means — and from the technical expertise of the individuals who act on behalf of their agency or company in the various ICANN (and related organizations) committees and conferences.

Society (WSIS)²⁵ responsible for establishing the basis of a global governance of digital activities. This initiative is however featured by three strong weaknesses:

- First, the objectives of the process are rather unclear. Because the various governments — and especially the US government — did not agree on a precise agenda before launching the process, the WSIS covers all the aspects of the regulation of the information society²⁶. This too broad agenda makes impossible to concentrate on a specific set of fundamental questions on which agreements and compromise would be discussed. In addition all the possible lobbies are playing a complex game in this process
- Second, the decision mechanisms are unclear. On the one hand, the WSIS is an intergovernmental conference organized by the UN. On the other hand, NGOs, corporations and many other categories of stakeholders are invited to contribute in the frame of a fuzzy process of consultation/contribution.
- Third, this process was launched without the agreement and is ran without the effective participation of the instances that are currently in control of the essential resources and of the technical regulatory tools that command the governance of the Internet. In particular the US Government does not support the process, meaning that what will come out of it will be hardly implemented²⁷.

²⁵ The UN General Assembly Resolution 56/183 (21 December 2001) endorsed the holding of the World Summit on the Information Society (<http://www.itu.int/wsis/index.html>) in two phases; hosted in Geneva in December 2003 and in Tunis in November 2005. The goal of a UN summit is fundamentally to settle a plan of action that could include intergovernmental conferences and the settling of new international organization. More generally, it aims at reaching consensus. The ITU was at the origin of the Summit and is in charge of organizing it. While recommending representation from governments at the highest level, the Summit also invited participation of all relevant UN bodies and other international organizations, non-governmental organizations, private sector, civil society, and media to establish a multi-stakeholder process. Several preparatory conferences, working group and on-line consultations were run to prepare the two phases of the Summit.

²⁶ According to the official declaration resulting from the Geneva Summit in 2003, the goals of the WSIS embrace techno-economic regulation of digital activities (provision of universal, accessible, equitable and affordable infrastructure and services; solutions aimed at guaranteeing information and network security; consumer protection, transparent, pro-competitive, technologically neutral and predictable public economic regulations. socio-politic regulation of the information and knowledge based activities (in particular the guarantee of privacy, pluralism and media diversity, optimal intellectual property regimes encouraging creativity and the need to share knowledge, education and the reduction of the digital divide) as well as the promotion of political and philosophical principles such as the rule of law, human rights and fundamental freedoms, the respect for cultural and linguistic diversity as well as traditions, religions ...

²⁷ From the US and ICANN point of view, the WSIS is seen as an attempt of, respectively, the UN and the ITU, to gain control over the regulation of the Internet. While there is a consensus about the idea that new instances overhanging the bodies in charge of the technical regulation should take into charge the societal regulation necessary for the development of the information and knowledge based economy and society, there is clearly a remaining fundamental opposition between multilateralism and an alternative vision. The leader of the alternative vision is clearly the US Government. However it is supported by a set of other stakeholders — from non US Governments to commercial interests and including NGOs — that fear a regulatory framework in which multilateralism would mean capture by governments, and especially non-democratic governments, of the regulation of the digital space. The forces opposed to the multilateral approach benefit of legitimacy, since up to now they developed a technical system that remains open and reliable. They moreover benefit from a strong position, since the US Government remains the owner of the essential resources of the Internet and is able, though a policy of bilateral agreements (with other governments or with private organizations. and of potential retaliations against commercial interests (in particular ISPs and equipments and software makers) to incite enforcement of the fundamental principles he promotes.

Thus, the instances and the processes that are currently at the heart of the regulation of the Internet do not guarantee at all that the first best institutional architecture to regulate the digital world could be designed and implemented.

This is well illustrated by the report of the Working Group on Internet Governance (WGIG) released in July 2005 to prepare the conclusion of the WSIS. The report (www.wgig.org) was prepared by a 40 members UN panel hailed from around the world and including representatives from business, academia and government. It benefited from multiple inputs provided by all kind of stakeholders. The working group was unable to agree on a single alternative. Instead, it presents four options. These range from a maximal option of a global internet council — based on three components, one to address policy issues, one for oversight and one for global coordination — within the UN system that would take over supervision of ICANN and set international internet policy, to a “status quo plus” arrangement that would enhance the role of ICANN's existing governmental advisory committee (GAC). Intermediate solutions are the creation of a world body to address public policy issues stemming from the work of ICANN, or creation of a body to address a broader range of public policy issues. In a context in which the US Department of Commerce continue to claim that it has no intention of giving up its historic oversight role of the Internet domain name and addressing system run by ICANN (stressing the need to ensure stability and security) it is likely that the WSIS will result in the settling of several forums to coordinate efforts in favor of on-line security (from the control spam to tracking and management of identity, to combat Internet-related crime, to harmonize business related legislation, to manage issues related to freedom of expression and human rights, etc., but will fail to implement instances able to really govern the Internet.

5. Toward a Step by Step Approach to the design of Regulatory Frameworks

Could a relevant order emerge from the complex process occurring today in which a wide number of individual and organizations are acting and interacting in an un-hierarchical way either by decentrally creating (private) orders or by lobbying in the various arena aimed at creating orders (from standardization committees to intergovernmental negotiations and including national law making processes or the design of self-regulations mechanisms)? The reply could be yes if a relevant arena to harmonize these initiatives could be organized.

Before analyzing how it could be possible, it is useful to consider the current situation. On the one hand, it could be considered as chaotic. On the other hand, there are several enabling conditions for a harmonization.

While there is a proliferation of regulating entities with different status, there is no hierarchy among them. More precisely, none of these entities is able to definitively impose its order to the others (even if some entities have more “bargaining” power than others). This is due to the self-implementation capabilities provided by the digital technologies to the various norm settlers. More precisely, on the one hand private norm settlers can bypass public authorities to implement faked or trans-territorial orders, but on the other hand, public authorities or social communities still benefit of their traditional means to set collective orders. Thus, whatever is the nature of the institutions currently involved in the settlement of rules that play a role in the regulation of the Internet have to “negotiate”, since no norms settler is able to impose its order to another norm settlers. This permanent “bargaining” is well illustrated by what is happening today about file sharing in the music industry among the P2P “communities”, the governments and the lobbies of the authors, artists and recording companies.

Second “negotiation” among the various producers of collective orders is possible and necessary because most of these orders are not complete. They do not seek to measure and make enforced a complete set of property rights, but delineate rights of use only for a limited number of uses and for a limited number of resources. In concrete terms, some private orders implement technical standards to organize on-line sharing of information, while other orders design rules to be applied to the encryption of information, while others organize auction mechanisms on specific markets, etc. While there is sometimes direct competition between two orders, much of the competition among norms settlers is at the fringe of their domain of competence. There are therefore many cases in which the various orders are complementary, and the promoters of these orders have incentives to negotiate (or to adopt some open meta-standards) to guarantee compatibility among their orders.

In addition to these two enabling conditions, there is a strong driver for a harmonization: the needs of users. Two phenomena are combining. First, the globalization of many activities, and in particular of the economy, makes it worthwhile for many players, especially businesses, to benefit from a global seamless information and coordination space. They have therefore a strong interest in the reduction of the trans-territorial heterogeneity of formal and informal public norms. Second, most communities behind private norms are not exclusive. They are fuzzy sets (in the sense of the fuzzy sets theory, meaning that a given individual often belong to several communities. Individual and organizations also push for an harmonization of the norms established by private digital/on-line norms settlers since it would simplify and make less costly the activities they perform in the various on-line communities they belong to²⁸.

While there is competition among norm settlers to establish and widen the scope of their coordination solutions (Eric Brousseau and Emmanuel Raynaud, 2005) there are enabling conditions and drivers leading them to harmonize the institutional framework they build. Indeed since the digital space is the locus where many norms inter-act, it is permanently revealing conflicts among private orders, among public orders, among public and private orders. Public and private norm settlers cannot ignore these conflicts of norms because they reduce the value of use of their norms, and their potential adoption. Moreover, they cannot rely only on the selection process among norms, because selection takes time and is uncertain.

To satisfy the adopters of their norms or potential ones and therefore their sustainability, norm settlers — whether they are public authorities, professional organizations, on-line self-organized communities, market organizers, etc. — have incentives to cooperate to solve conflict either ex-ante or ex-post.

Ex-ante, multiple decentralized negotiations already exist. Two types of negotiations occur. First, often organized at the national level, public authorities negotiate with the private order settlers, often by involving them in the processes of adapting the legal order to the opportunities and constraints rose by digital technologies and by the development of the knowledge based economy. Second, at the global level there is a minimal coordination among the various private entities, which responsibilities overlap or interact. When one considers the “technical” regulation of the Internet, there are for instances various formats of coordination among the IETF, the W3C, the ICANN, and many other standards setting committees. In addition, a weak coordination exist among public orders through the management of international treaties and inter-governmental organizations responsible for designing common

²⁸ Even if in some cases one of the advantage of on-line activities is that they allow individuals to live several parallel lives

rules to be applied to information resources and networks (WIPO, ITU, etc.). Negotiations take place also within not specialized intergovernmental organization like the UN, the OECD, or the European Union. Negotiations occur then, but their decentralization do not guarantee at all convergence. Moreover, targeted and local negotiations may end-up by incompatible agreements, transforming only the “level” of discrepancies among decentrally settled norms. It would therefore be useful to implement an international forum in which these decentralized negotiations could be, even weakly, coordinated. A minimal way to do it would simply be to share information and knowledge about the properties of alternative regulations. To a certain extent, a common blackboard, as those who characterize many on-line communities (Gensollen, 2005). would be a useful tool to allow sharing of experience and knowledge, and to incite to the adoption of more efficient practices. Of course, such ex-ante coordination could be deepened, especially under the pressure of users/citizens, who would value more universal platforms of coordination (to manage the production/distribution/sharing of information and knowledge, and to support inter-agent coordination).

One of the main drivers of the evolution of rules toward common rules is the (judicial) resolution of conflict. Indeed, when there are gains to trade or to cooperate, when exchanges are hindered by discrepancies among property rights systems, and among collective regulations, parties have strong incentives to have the system of rules evolving. They can bypass the existing institutional framework, but it has a cost (either because they have to settle alternative orders, or because the existing framework being mandatory — e.g. the law — bypassing it could be costly). The alternative strategy is to try to have its conflict resolved by a mechanism responsible in last resort for solving conflicts between the two orders. In addition to the (local) conflict resolution, such a solution has a strong advantage. It allows those who are in charge of settling collective orders to learn about the inefficiencies of the solution they implement. In addition, the way the conflict is solved can provide the two norms settlers with solutions to avoid future conflicts. Put another way, conflict resolution is a powerful tool to allow not only an ex-post solving of problems due to conflicts among norms, it allows to benefit from learning capabilities and innovation efforts aimed at identifying discrepancies among norms and satisfying solutions to harmonize them. Again, this call for a common arena to solve conflicts related to the proliferation of regulations in the cyber-world. To a certain extent, the cooperation between the WIPO and ICANN played this role in the case of property rights over commercial names (trademarks and domain names; Cécile Meadel and Meryem Merzouki, 2004).

Implementing a framework, comparable in its functioning but not in its constituency to the World Trade Organizations (WTO). in which the various norm settlers would be able to explicitly negotiate ex-ante and to solve ex-post conflicts would therefore be the second rank solution to the current problem raised by the proliferations of public and private orders on the Internet. It would be a second rank solution because it would be less satisfactory than the management of an ex-ante coordination based on the settling of basic constitutional rights of the global cyber-citizens and the implementation of an authority of last resorts to guarantee them. Indeed, it would take time to reach a global agreement on a set of fundamental basic rights, and the negotiations being organized among unequal norm settlers, the optimality of the solution would not be guaranteed. However, an organized negotiation has two advantages over fully decentralized negotiation. Centralization is a necessary (not sufficient) condition for designing consistent “local” solutions. In addition, centralization allows benefiting from learning and knowledge sharing effects.

References

- Barzel, Yoram .1989. *Economic Analysis of Property Rights*, Cambridge: Cambridge University Press.
- Baumol, William J., John C. Panzar and Robert D. Willig .1982. *Contestable Markets and the Theory of Industry Structure*, San Diego: Harcourt Brace Jovanovich.
- Bernstein, Lisa .1992. “Opting out of the legal system: extra legal contractual relations in the diamond industry”, *Journal of Legal Studies*, 21, 115-157
- Bernstein, Lisa. 1996. “Merchant law in a merchant court: rethinking the code’s search for immanent business norms”, *University Pennsylvania. Law Review*, 144(5) 1765-1821
- Besen, Stanley M. and Leo J. Raskind.1991. “An introduction to the law and economics of intellectual property”, *Journal of Economic Perspectives*, 5, 3-27.
- Brousseau, Eric. 2001. "Régulation de l'Internet : l'autorégulation nécessite-t-elle un cadre institutionnel ?", *Revue Economique*, Special Issue, "Economie de l'Internet", ed. by Eric Eric Brousseau and Nicolas Curien, octobre 2001, vol 52, pp. 349-377
- Brousseau, Eric. 2004a. “Property Rights in the Digital Space”, in Enrico Colombatto (ed) *Companion to Economics of Property Rights*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Pub, 2004, 438-472
- Brousseau, Eric. 2004b. “Property Rights on the Internet: Is a Specific Institutional Frame needed”, *Economics of Innovation and New Technology*, 13(5) July 2004, 489–507
- Brousseau, Eric and Christian Bessy. 2005. “Public and Private Institutions in the Governance of Intellectual Property Rights”, in B. Andersen (ed). *Intellectual Property Rights: Innovation, Governance and the Institutional Environment*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Pub, 2005
- Brousseau, Eric and Emmanuel Raynaud. 2005. “The Economics of Private Institutions”, Mimeo, EconomiX, University of Paris X
- Brousseau, Eric and Mhand Fares. 2000. “The Incomplete Contract Theory and the New-Institutional Economics Approaches to Contracts: Substitutes or Complements ?”, in Claude Ménard (ed) *Institutions, Contracts, Organizations, Perspectives from New-Institutional Economics*, Chltenham: Edward Elgar Pub., pp. 399-421.
- Brousseau, Eric and Thierry Pénard. 2005. “The Economics of Digital Business Models: A Framework to Analyze the Economics of Assembling” Mimeo, EconomiX, University of Paris X
- Coase, Ronald .1960. “The problem of social cost”, *Journal of Law and Economics*, 3, 1-42.
- Cooter Robert D. 1994. “Structural adjudication and the new law merchant: a model of decentralized law”, *International Review of Law and Economics*, 14, 215-231.
- Cooter, Robert D. 1996. “Decentralized law for a complex economy: the structural approach to adjudicating for the new law merchant”, *University of Pennsylvania Law Review*, 1643-1696
- Economides Nicholas and Steven C. Salop. 1992. “Competition and Integration Among Complements, and Network Market Structure”, *Journal of Industrial Economics*, XL(1) March, pp. 105-12
- Economides Nicholas. 1996., “The Economics of Networks”, *International Journal of Industrial Organization*, 14(2). March, pp. 673-99
- Elkin-Koren, Niva and Eli Salzberger. 2000. “The economic analysis of cyberspace: challenges posed by cyberspace to legal theory and legal rules”, *International Review of Law and Economics*, 19, 553-582.
- Frischmann, Brett M. 2001. “Privatization and commercialization of the internet: rethinking market intervention into government and government intervention into the market”, *Columbia Science and Technology Law Review*, Volume II .2000-2001. <http://www.stlr.org/html/archive/> [accessed June 2005]
- Gensollen, Michel. 2005. “Information Goods and Online Communities” in Eric Brousseau and Nicolas Curien (eds) *Internet Economic, Digital Economics*, Cambridge,UK: Cambridge University Press
- Granovetter, Mark. 1985. “Economic action and social structure: the problem of embeddedness”, *American*

Journal of Sociology, 91:3, November, 481-510.

- Hooghe Liesbet and Gary Marks. 2001. "Types of Multi-Level Governance", *European Integration online Papers* (EIoP) , 2001, vol. 5, <http://econpapers.hhs.se/article/erpeioxxx/p0071.htm> [accessed June 2005]
- Leiner Barry M. Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts, Stephen Wolff. 2000. "A brief history of the Internet", <http://www.isoc.org/the Internet/history/brief.html>. [accessed June 2005]
- Lemley, Mark A. 1999. "The law and economics of the internet norms", *Working Paper*, University of California at Berkeley.
- Lessig, Lawrence. 1999. *Code and other Laws of Cyberspace*, New York: Basic Books.
- Méadel, Cécile and Meryem Marzouki, 2004. « Quelle justice pour Internet ? L'arbitrage sur les noms de domaine », in Françoise Massit-Folléa and Proulx, Serge (eds). *Internet, nouvel espace public mondialisé*, Paris: Les Canadiens en Europe
- Milgrom, Paul, Douglass C. North and Barry Weingast. 1990. "The role of institutions in the revival of trade: the law merchant, private judges, and the Champagne fairs", *Economics and Politics*, 2(1). March, 1-23.
- Mueller, Milton M. 2002. *Ruling the Root: Internet Governance and the Taming of Cyberspace* Cambridge, Ma. : MIT Press
- Noe, Thomas H. and Parker, Geoffrey, 2000. "Winner Take All: Competition, Strategy, and the Structure of Returns in the Internet Economy" (November 12, 2000). <http://ssrn.com/abstract=250371> [accessed June 2005]
- North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press
- Oates, Wallace E. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- Oates, Wallace E. 1999. "An Essay on Fiscal Federalism." *Journal of Economic Literature* 37: 1120-1149.
- Ostrom, Elinor, and James Walker. 1997. "Neither Markets nor States: Linking Transformation Processes in Collective Action Arenas." In *Perspectives on Public Choice: A Handbook*, edited by Dennis C. Mueller. Cambridge: Cambridge University Press, 35-72.
- Rosenau, James N. 2001. "Strong Demand, Huge Supply: Governance in an Emerging Epoch." Paper prepared for the Conference on Multi-Level Governance: Interdisciplinary Perspectives, sponsored by the Political Economy Center of the University of Sheffield. Forthcoming in I. Bache M. Flinders (eds) *Multi-Level Governance*, Oxford, Oxford Univeristy Press, 2004
- Shapiro Carl and Hal R. Varian. 1999. *Information and Rules*, Cambridge: Harvard Business School Press.
- Voigt, Stephan (ed). 2003. *Constitutional Political Economy*, Chltenham: Edward Elgar Pub . "The International Library of Critical Writings in Economics series ", vol 166