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Law and Economics in Cyberspace

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I. Introduction: Cyberspace and Three Generations of Economic Analysis of Law

More and more people around the world are spending an increasing portion of their time surfing the Internet or operating in Cyberspace. In the past few years Cyberspace has become an integral part of people's everyday lives. People get their information in Cyberspace, obtain their entertainment there, do business in Cyberspace, and even develop their social relationships there. People live in Cyberspace. Currently, people also live in the old nonvirtual world, but for an increasing number of people some real-world activities are becoming and will become marginal. Instead of going to school, university, the public library, the museum, or the theater, people view art, obtain knowledge, and spend their leisure time in Cyberspace. Instead of driving to the supermarket, the bank, or the social welfare bureau, people click several buttons on their computer to do business, communicate with government agencies, or settle their finances.

The increasing human activity in Cyberspace is transforming social and cultural norms, affecting language,[1] creating new communities, drawing new borders, and can even be thought of as changing the definition of the self. In Cyberspace we are user names (sometimes more than one per physical human) using passwords, with no geographical locations or with multiple geographical locations. The growing entity of Cyberspace also exerts a crucial influence on the perception of law, and, by derivation, on the economic analysis of law.

This article is intended to provide a preliminary and tentative look at the changing world of law with the emergence of Cyberspace from the perspective of the economic approach to law. One can describe the law and economics movement as comprising three generations, which can be perceived as separate paradigms of sorts: the traditional Chicago School economic analysis of law; transaction cost analysis; and neoinstitutional economic analysis of law and of legal institutions.[2] The Chicago School views the

[1] Did you know that CAPITAL LETTERS in Cyberspace is shouting, :-) is kidding, and bbl means I will be back later? See also Gibbons (1997) who argues that Cyberspace is a community with diverse characteristics, linguistically, culturally, and economically. Internet users (Cyberians), for instance, dislike capital letters because they requires an additional stroke on the keyboard.

[2] As some of the roots of the neoinstitutional law and economics can be traced to the 18th century works of Borda and Condorcet, the term "generation" is being used here not merely on chronological bases, but more as an indicator for the width and complexity of the economic analysis. As the science of economics is cornered on the transformation

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microeconomic model as the suitable theoretical framework for the analysis of all legal questions, including those that are not traditional market issues. The tools of microeconomic theory—the curves of supply and demand—can be applied to analyze the market of children for adoption, the market of crimes, or the market of laws in general, as they are applied to the market of apples or cars. The Chicago framework does not distinguish between rational individuals and other, more complex, market players such as firms, governments, or agencies. The state, its structure, and institutions are perceived as exogenous to the analysis. Markets and states are assumed to correspond to each other.

A transitional generation in the development of the law and economics thought is transaction cost analysis. Its starting point is, in fact, an extension of the Chicago School; this extension eventually brought about the third generation of neoinstitutional law and economics. The heart of transaction cost analysis is the Coase theorem, which undermines the categorization of the traditional market failures and especially the analysis of the remedies to correct them. Coase's analysis points at transaction cost as the sole factor that diverts the market from efficiency and, thus, the sole factor to take on board when legal rules are considered. The concept of transaction cost, which was originally used to analyze the interaction between individuals in the market, was soon broadened to include the analysis of the emergence of institutions, their internal decision-making process, and their external interactions. In doing so, the methodological tools used for the analysis were expended and hence the shift toward the third generation.

This third generation, which can be associated with the neoinstitutional paradigm, is the broadest framework of economic analysis insofar as it incorporates institutional structures as endogenous variables within the analysis of law. Thus, neoinstitutional analysis views the political structure, the bureaucratic structure, the legal institutions, and other commercial and noncommercial entities as affecting each other. Political rules intertwine with economic rules, which intertwine with contracts. The tools used in the analyses of neoinstitutional law and economics are the traditional microeconomics or welfare economics models, alongside public choice, game theory, and institutional economics.[3]

Although we use the term "generation" in the description of the three major paradigms of law and economics, the first generation—the Chicago school—is very much alive. Significant work in law and economics is being carried out in this framework. Thus, it cannot be transgressed when we apply the law and economics thinking to Cyberspace. We will begin, therefore, in Section II, by examining the characteristics of the market in Cyberspace, analyzing possible market failures in comparison to market failures in the nonvirtual world, and drawing from this analysis some general descriptive and prescriptive insights as to the nature of law, the organization of communities, and the role of states. Section III focuses on the application of transaction cost economic analysis to Cyberspace. Section IV discusses the role of "law" and offers several general thoughts about the "state" or our public sphere in light of the neoinstitutional school of law and economics.

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of real-world reality into a simplified setting that is the basis for applying rigorous models of analysis, the presuppositions that set the framework for the modeling can determine the complexity of the analysis and, thus, the precision of its results. In this sense, the Chicago school can be labeled as first-generation law and economics, while neoinstitutional law and economics can be labeled as third generation.

[3] For a broad definition of neoinstitutional law and economics, which consists of the works of Coase, Williamson, Stigler, and Buchanan and Tullock, among others, see Mercuro and Medema (1997), Ch. 5.

The main foci of the paper are on the challenges that Cyberspace poses to the whole project of economic analysis of law. Our conclusion in Section V is that the emergence of Cyberspace may require some fresh conceptual thinking by the law and economics movement.

II. The Chicago School of Law and Economics in Cyberspace, or Cyberspace as a Market and its Failures

The fundamental tenet of the Chicago approach is that competition within a perfect market will lead to efficiency, which is the desirable normative goal of the legal system. Central intervention within the market is justified, according to the Chicago analysis, only when there is a market failure. Such a failure exists when there are no multiple players on both sides of the market (the problem of monopolies), when these players do not have symmetric and full information relevant to their market activities, when any of the players bypass the market through involuntary actions (the problem of externalities), or when the traded commodity is a public good. This general premise was advanced by the economic approach to law in several directions, the two most important of which are (1) analyzing the emergence of the state, its central government, and its institutional structure as derived from problems of collective actions that are market failures of sorts, and (2) defining in what circumstances it is justified for the central government to intervene in shifting the market solutions, circumstances that again are related to market failures.[4] The general orientation of the Chicago school, however, is that these circumstances are rare and that in the real world there is too much central intervention.

The following discussion adheres to the doctrinal analysis and examines separately the four traditional market failures, as applied to Cyberspace.

Monopolies

Under conditions of perfect competition, producers and consumers see the price as fixed and, therefore, set their quantity of output or input on a level at which their marginal costs or benefits equal the price. A single producer (monopoly) or a single consumer (monopsony) sees a changing price curve and, therefore, sets its output or input in a way that maximizes its profit, leading to an inefficient level of production or an inefficient market solution. The same premise applies to a situation in which there is a very small number of producers (cartel) or consumers who coordinate their market actions. Antitrust laws are meant to replace monopolies with competition where possible or to prevent the creation of monopolies (for example, by prohibiting mergers) or price coordination. When a monopoly is a natural situation due to the scale of the market or in the case of public utilities, the monopoly is allowed to continue to exist, but it is closely regulated by the government or by another official agency. Sometimes monopolies are even created by the government to remedy other market imperfections. Such is the case, for example, with a patent system.

Cyberspace has several features that, on the one hand, are likely to decrease monopoly problems and, hence, to reduce legitimate central intervention, but, on the other

[4] See Cooter (1997), who asserts that in the 1970s, economists drawing on the analysis of externalities and public goods reached a remarkable consensus concerning the intellectual framework for analyzing and justifying state regulation of the economy. According to this framework, a *prima facie* case for public intervention requires demonstration of the failure of a free market. See also Breyer (1982) and Schultze (1977).

hand, may create new types of monopoly problems, which might call for innovative solutions. Some of these features are described next.

1. One of the important sources for monopolies in the nonvirtual world is high entry costs and the need for a substantial initial investment to establish a business in the market. These features can characterize a natural monopoly, a condition in which the fixed costs involved in production are very large so that it is more efficient for a single provider to serve the market. But they also can characterize unnatural monopolies. This factor of entry barriers and high fixed versus changing costs, combined with tactics of short-run price cuts by existing market players to prevent new entries, maintains existing monopolistic powers. In Cyberspace, entry costs are significantly lower so that short-term tactics to prevent new entries into the market may prove less effective.

   Consider, for instance, the publishing business. Entering such an industry in the nonvirtual world of printed materials requires major investments, such as purchasing and operating a printing press, purchasing paper, and paying distributors for shipment and handling. In Cyberspace, any 10-year-old can become an independent publisher. With the click of a mouse she can distribute text to millions of Internet subscribers.

2. A related issue is the size of the market. The emergence of many nonvirtual monopolies has to do with market scale. A very small market may not justify more than one provider of a certain product. Cyberspace has no fixed borders. Cybermarket is a global market place. It is certainly not a defined territorial unit, and the use and movement of resources is not restricted to any territory. National boundaries hardly apply to Cyberspace, and protective policies such as customs and other trade barriers become less feasible. Such barriers can be easily bypassed in Cyberspace by shifting the "location" of the transacting players.[5] What is complicated and costly in the nonvirtual world, can be achieved by pressing a button on the computer. The market of Cyberspace is indeed global. Users can purchase a copy of a popular computer program from their local vendor—licensed, often exclusively, to distribute in a particular territory. But users may also obtain the program from another country by mail order or by downloading it directly from the Internet.

   As Internet services are increasingly delivered through wireless systems to portable computers, it becomes more difficult to ascertain the location from which the service or product has been provided. Consequently, monopolies, which in the nonvirtual world result from the size of the local market, are likely to disappear. In this respect, the feasibility of on-line business also may affect monopolies that currently operate in the nonvirtual world. For instance, virtual bookstores, such as Amazon, push nonvirtual book chains such as Blackwell and Barnes & Noble into the Cybermarket, and this in turn may affect the monopolistic powers of local bookstore chains that do not step into Cyberspace. Thus, economics of scale is likely to scale down significantly, diminishing monopolistic powers.

[5] Consider, for instance, attempts by territorial states to tax on-line transactions. It is becoming more difficult to ascertain the location in which the taxable service or product has been provided. Furthermore, taxing on-line transactions would require an increasingly higher level of control over on-line transmission. Taxing such transactions would require tax collectors to monitor on-line transmission and to distinguish transactions in virtual goods (such as a computer program or a news article) from mere information exchange.

Cyberspace may play various roles in e-commerce. It may provide merely a platform for marketing efforts of vendors (advertising, contacting actual and potential users, and distributing information and coupons). It can serve, as it increasingly does, to facilitate the transaction formation by allowing customers to place an order that is later delivered by mail. Cyberspace may also allow the execution of the entire transaction. Informational goods (computer programs, music, video clips, text, and data) may be delivered on-line. When the parties use Cyberspace merely to process orders, its effects, save the efficacy of protective measures of national governments, are similar to that of mail order. It expands the variety from which customers may choose and, therefore, enhances competition. Like mail order, however, the performance of vendors may still depend on an infrastructure in the real world allowing prompt distribution at low cost. Yet when the entire transaction is performed in Cyberspace, the advantage of such local infrastructure is significantly lower, so that monopolistic effects may be further reduced.

3. Scarcity, especially scarcity of the public domain, is yet another explanation for the emergence of monopolies. Take, for example, the communication and broadcasting industry. Its monopolistic character has partly to do with the scarcity of frequencies available for television and radio broadcasting and the scarcity of infrastructure elements with regard to cable systems. In both cases, intervention by the government in allocating frequencies, controlling cable operators and their contractual relations with station owners, and even controlling some content was deemed justified on antimonopolistic grounds.[6]

   Cyberspace is less scarce than the real world. It allows almost endless communication and broadcasting activities. Hence, less regulatory intervention in Cyberspace is justified, and in a way that is similar to the analysis of the economics of scale, this might easily slip over to nonvirtual broadcasting as well.[7]

   Our analysis so far tends to point at a significant decline in the market failure of monopolistic powers, which indicates less justification for central intervention in the market. However, other features of Cyberspace may operate in an opposite direction, increasing monopolistic power and introducing new types of monopoly problems that might demand innovative solutions.

1. One such feature has to do with connectivity and interoperability.[8] The use of any network, especially a global network that consists of a large number of independent networks, heavily relies on the use of shared standards. Interoperability requires products and technologies used on the net to have functional characteristics that permit their functioning in connection with other technologies. Such technologies operating in Cyberspace should be able to communicate with one another, to process input created by other products, or to create an output that is processable by other on-line procedures. Connectivity and compatibility require some level of shared use of technological standards.

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[6] See *Turner Broadcasting Sys. Inc. v. FCC*, 114 s. Ct. 2445; Sunstein (1995).

[7] See *Reno v. American Civil Liberties Union*, WL 348012 (US); Gibbons (1997) pp. 547 ff.

[8] Band and Katoh (1995) prescribe two meanings for the term "interoperability." One is interchangeability, namely, "the degree to which one product can substitute for another." The other is connectivity, which refers to "the degree to which a product can participate in a joint activity without requiring other connected products to alter their mode of operation."

Consequently, any new technology introduced into Cyberspace must be compatible with other existing systems operating in Cyberspace. It must conform to specifications of existing technologies, which often are held by private parties as trade secrets, patents, or other types of intellectual property.[9] A firm that controls the standards controls a bottleneck establishing monopolistic power. It may further allow leveraging a monopoly from other markets into Cybermarkets.

For instance, Microsoft controls the operating systems of most personal computers connected to Cyberspace. It owns intellectual property rights in the technologies essential for anyone who wishes to develop a product that will be accessible by Internet users. The recent antitrust legal action brought against Microsoft alleges that Microsoft has incorporated its Web browser (Explorer) into its operating system, thus attempting improperly to drive the Netscape Web browser out of the market.

2. A related feature of Cyberspace that may increase monopoly effects has to do with network externalities. These are created when the use of one product is more beneficial the more people use it. The more widespread the use of a word processor becomes, the more beneficial it becomes to the users. If we all use the same word processor, we would save the time involved in converting files, the costs of correcting errors, and even the costs caused by the inability to process digital files created by another program.

   Network externalities are typical of a network environment such as Cyberspace because this environment is based on connectivity and compatibility. Cyberspace is a network, and it becomes more beneficial to its users, either as a marketplace or as a public forum, with every additional user who is connected. Furthermore, products that are operated in an on-line environment should be interoperable to increase connectivity. Once an on-line product becomes widespread, it gains value not merely owing to its technological superiority but also, and sometimes only, owing to its prevalence.[10] Network externalities may limit competition by increasing the cost of entry. They provide a significant advantage to first comers, who can establish their products as the standard for future goods.[11]

3. Finally, Cyberspace is a sophisticated technological infrastructure that is used by consumers without any intermediaries. Every new product involves costs of learning and adapting to the new method of work. Consequently, the cost of switching to a new technology may be prohibitively high. This may further increase entry cost and, thus, may have a restraining effect on competition.

To summarize, Cyberspace reduces the traditional nonvirtual monopolistic problems, but it creates new ones. These special monopolistic effects in Cyberspace are strictly related to technology and standards. The identification of such monopolistic power is different from the identification of monopolies in the nonvirtual world, and the traditional remedies of price and quantity control may not be efficacious to remedy these problems. The shape and the type of justifiable legal intervention cannot derive

[9] See Lemely and McGowan (1998).

[10] Microsoft Word uses a Hebrew standard that is accessible only by Microsoft Explorer and not by the competing browser Netscape. Thus, domination over the wordprocessor market allows Microsoft to dominate the market for browsers in Hebrew and to increase the cost of entry (or entirely prevent entry) by a competing browser.

[11] See Lemley and McGowan (1998), p. 495.

from the traditional market analysis of supply and demand. The new monopolies of Cyberspace, therefore, require fresh economic thinking.

Public Goods

A public good is a commodity with two distinctive but related characteristics: nonexcludability and nonrivalry. Nonexcludability occurs whenever it is either impossible to exclude nonpayers (free-riders) from using the resources, or the costs for such exclusion are so high that no profit-maximizing firm is willing to produce the good. Nonrivalry means that the use of such resources by one user does not detract from the ability of others to use it. Public goods are not likely to be produced and supplied by the market, and if they are privately provided, they are likely to be undersupplied. Thus, government intervention is necessary to guarantee the optimal supply of public goods, either by subsidizing the private provision of the good or by producing it itself.

Information under standard economic analysis is such a public good. Its consumption is nonrivalrous, and the use of information cannot be efficiently excluded.[12] This is because information has no physical boundaries, and its duplication and distribution involve relatively low costs. The marginal costs of exclusion are often greater than the marginal costs of provision, so it is inefficient to spend resources to exclude nonpayers. Such free-riding reduces the incentives for investment in generating new information, and without government intervention information tends to be undersupplied. Government intervention in the real world takes the form of intellectual property laws. These stimulate creation by providing creators with a legal right to exclude. They allow creators to use the power of the state to exclude nonpayers and to deter potential free-riders. By legally excluding nonpayers the law facilitates the ability of creators to reap returns on their investments by collecting fees for the use of their works.[13]

Information is central to Cyberspace. Cyberspace is a virtual world in which almost everything boils down to information. Every interaction among users over E-mail and group chats is, in fact, interactive exchange of informational signals. Surfing the Internet is data mining. Internet advertising distributes information over Web sites. The main commodities that are exchanged in Cyberspace are informational products such as texts, music, data, or computer programs. Furthermore, the transactions themselves are no more than information processing.[14] The rich human interactive environment of Cyberspace is merely the creation, procession, and transmission of information. Consequently, the share of public goods of all property in Cyberspace is far greater than in real world. According to traditional economic theory, this means that there is a need for massive intervention by the government.[15] Is this really the case?

Cyberspace transforms the way information is produced and distributed. Information is no longer embodied in physical objects such as paper or CDs. Information in

[12] See, generally, Landes and Posner (1989) and Mennel (1987, 1989).

[13] Intellectual property laws create monopolies, but at the same time they keep this monopoly limited to serve its ultimate purpose of maximizing access to information. These laws, thus, regulate access to information by balancing the incentives to create and enhancing the accessibility of information.

[14] Consider, for instance, the purchase of a program from a website. A user visits the site, browses through information about products and prices, selects the products to be purchased by clicking on them with her mouse, places an order in which information is registered, makes a payment, which again does not involve any money exchange but merely information processing of one's credit card number, etc., and finally downloads the product that is in fact bites of information.

[15] See also Gibbons (1997), p. 482.

Cyberspace is delivered without the usage of any physical medium; instead it involves the transmission of electronic signals.[16] Electronic delivery of information involves low cost and does not require any large investment in the production of copies and distribution channels. Distribution of copies in Cyberspace is performed routinely by all users from any work-station connected to the Internet. Furthermore, disseminating information may not involve any distribution of copies but, instead, the provision of access to a copy.[17]

How does this affect the economic analysis of information as a public good? The first impression is that Cyberspace tends to convert information that is a private good in the nonvirtual world to a public good in Cyberspace.[18] Because of the low cost of copying and distributing information on the Internet and the dematerialization of information, the prevention of unauthorized use of information and the tracking down of violators are less likely to occur. Thus, we may expect a growing manifestation of free-riding, which characterizes public goods.

But the more significant point here is that Cyberspace enhances the ability to exclude and control the distribution of information to the extent that makes it no longer a public good. The nature of information in Cyberspace, as discussed above, allows the application of cost-effective self-help technical measures to control the consumption and use of information. Such means allow excluding information that used to be nonexcludable. Indeed, the creation of digital copies involves very low cost. Yet, the distribution of copies is no longer the sole way of generating profits. One shift is from selling copies to charging for access. The new technical frontiers permit collecting a fee for access to a Web site and charging per-use of the information provided. They allow temporary entrance permits and restriction of usage of information to on-line individual use, blocking the possibilities of copying information or forwarding it, and more.[19]

The results of this analysis seem to be ideal: On the one hand, Cyberspace is causing a significant increase in the production and distribution of information; and, on the other hand, that information can no longer be regarded as suffering from the public good deficiencies. Thus, government intervention is not required or desirable.

This, however, is not the full picture. The development of exclusion measures is likely to encourage users to develop counter code breaking and hacking tools. This, in turn, will lead to sophistication of the exclusion tools and to a continuous technological race between the two sorts of devices. Such a race may divert funds that might otherwise be invested in more productive directions. This futile competition may require central intervention, which is very different from government intervention in the traditional public goods framework. Here the government will not be called on to provide the public good or the legal means to enable its production by private firms. Central

[16] Disseminating information on the Internet involves providing users with access to information represented digitally rather than the distribution of physical copies. See Landow (1992). Once materials are posted on a Web site any user may access such materials and often download the file. One may simply post files on one's Web site for remote retrieval by the public. On dissemination by access, see Elkin-Koren (1996), pp. 250–254.

[17] For instance, digital networks provide remote access to large databases on mainframe computers. Information may be available to users by downloading from a bulletin board or a database. Another way of dissemination by access is by making files available on the network for the use of the general public. Anonymous FTP (File Transfer Protocol) is the posing of files, for remote retrieval by the public, in a publicly accessible directory. Anyone is able to log in anonymously and retrieve the files in the public access directory. See Landow (1992) p. 23.

[18] For such an argument see: Trachtman (1998), notes 38 and 39 and accompanying text.

[19] See Bell (1998) and Dam (1998).

intervention may be required here to halt or control the technological race between exclusion tools and their counter technologies.[20]

The extent to which information in Cyberspace is a public good is, therefore, not clear-cut. It depends, among other factors, on the technological state of the art. The technologies available in Cyberspace are changing at a rapid pace. Consequently, the public good analysis may not be very conclusive in determining when government intervention is necessary.[21] Technological development and innovation is an outcome of a complex interaction between knowledge and social institutions such as laws and markets. Technological developments should not be perceived as external to market process as they are perceived by the Chicago law and economics analysis. As in the case of monopolies, we believe, therefore, that the tools of the traditional economic theories with regard to public goods are not sufficient for the analysis of Cyberspace.

Lack of Information

The hypothesis about competitive markets, which result in optimal production and distribution, is contingent on the assumption of full information. Information refers to a knowledge of prices, preferences, and quality. Lack of such information, and more especially asymmetry in information (e.g., where the seller knows more about the quality of her product than the buyer), can lead the market to a failure, thus requiring central intervention. It can be in the form of the production of information by the government, or by intervening in the voluntary market exchange, for example, by imposing duties of disclosure.

As we have seen above, Cyberspace is almost all about information. Moreover, the sophisticated engines of the Internet provide us with a lot of information, which in the real world is difficult and costly to obtain. When a rational person plans to purchase a good in the nonvirtual market, a necessary preparatory activity is to inquire at shops and suppliers about prices and other sale and product conditions. This is not an easy task. It requires time and resources. A rational person will make such inquiries until the marginal benefits from further inquiries equal the marginal costs of such activity. In any case, the costs inflicted, even up to this stage, constitute an imperfection of the market.

The equivalent picture in Cyberspace is very different. With the tip of a finger, the Cyber-customer can run various software programs that compare prices, quality, contractual clauses, and other pieces of information. Some of these programs can go even further and conduct the transaction. Likewise, as the production and distribution of information are easier and cheaper than in the nonvirtual world, customers who were not satisfied with the product (or vice versa) can easily make their dissatisfaction common knowledge. Although this activity in Cyberspace is not totally costless, in the same time frame one can obtain significantly more information for a much smaller investment.

These quantitative differences, we believe, amount to qualitative differences. Here is one example. Game theory analysis distinguishes between games that are played once

[20] Dam (1998) believes that such a race requires government intervention in prohibiting circumventing means, but he suggests that such regulation should be carefully drafted to avoid preventing technological development altogether.

[21] See, for instance, the National Information Infrastructure Copyright Protection Act (NIICPA), H.R. 2441, 104th Cong., 2d Sess. 1995, which is based on the U.S. Department of Commerce, Information Infrastructure Task Force, final report of the Working Group on Intellectual Property Rights: Intellectual Property and the National Information Infrastructure (1995) (White Paper). This paper emphasizes the threat introduced by the Internet to the interests of copyright holders and recommends the expansion of the rights granted to owners for on-line distribution.

and games that are repeated. Many one-round games tend to result in inefficient solutions as defection is likely to occur. Most repeated games, by contrast, tend to result in efficient outcomes, as cooperation will be chosen by the players. This general and simplified statement can distinguish cases in which central intervention is not desirable (repeated games) from situations in which central intervention is required (one-shot games). The flow of information in Cyberspace can turn typical one-round games into repeated games, thus eliminating the need for central intervention in the market.

Consider, for example, a tourist who is planning a journey in which she will stay one night in every city she visits. She considers the hotels to book into. Beecause she is staying only one night in each hotel, her contractual relations can be characterized as a one-round game. Her travel agent shows her pictures of possible hotels and short descriptions of them. She might be shown several options and select from them. If the hotel does not meet her expectations or its description turns out to be inaccurate, but not to such a degree that our tourist would consider a lawsuit, the game is over. Other potential tourists will not benefit from this information. They will be engaged in separate games, ending similarly. Hotels might take advantage of this situation.

Booking a hotel through the Internet is a different story. The tourist can examine and compare more options. The details provided on the hotels are more comprehensive, including a variety of pictures and maps, for example. They are provided by several sources, such as travel agencies, the hotels themselves, independent tourist bureaus, and the general public. Many sites on the Web allow tourists to read opinions of former guests, unedited, and thus are more likely to be independent and impartial (which is not always the case with tour guides, for example). This fact tends to shift the booking contract from a one-off game to a repeated game in which the collective body of tourists can be considered as a player. Under such circumstances, central intervention due to lack of information or asymmetric information would not be justified.

Although some costs of information, such as collecting and communicating it, are reduced in Cyberspace, other information costs may increase and new types may appear. Such are the costs related to determining the reliability of information circulated in Cyberspace. We have seen that the relatively low cost of on-line publishing allows literally every user to become an information provider. Everyone can post information and make it accessible to millions of users around the world. The provisions and distribution of information in Cyberspace are decentralized. Cyberspace does not create the same bottleneck effect that characterizes traditional methods of communicating information.[22] The ability to communicate directly at low cost reduces the need for intermediaries providing and distributing information, such as publishers and the mass media industry. The absence of intermediaries causes the proliferation of information. Information, which was previously unavailable because its distribution was not cost effective, may become available.[23]

Decentralized sources of information create, in turn, a problem of ascertaining the reliability of such information. The distribution of information in the physical world includes clues that indicate reliability. If one reads an article published by the *New York Times*, one can assume that writers took standard steps to certify the reported facts. If

[22] Elkin-Koren (1996), pp. 402–403.

[23] The high cost involved in mass distribution in the nonvirtual world (establishing a printing press or a broadcasting network) dictates the type of information that is produced. Providers would invest in the production of information for which they can charge (sell copies, charge for use, sell commercials). Thus, information for which the potential market would be too small is not produced at all.

one reads news in a tabloid, one is less likely to assume that an event really happened. How can you know whether things you read on the Internet are reliable? Well, to some extent one may use the truth traits one uses in the nonvirtual world. Thus, if one reads the article on the *New York Times* Web site, one may rely on it—at least, if the site is indeed operated by the *New York Times*, but not if one takes the article from an unknown source. Identification of the source in the real world is performed by physical assets, geographical locations, identifying actual people, and names which are protected by trademarks.[24]

Authentication in Cyberspace cannot rely on such agencies. It is technically easy to disguise the source to an extent that makes it unidentifiable or misleading. Information presented digitally is very easy to change. While printed information is fixed, digitized information may be easily manipulated. Thus, if one reads a court's decision on the Internet, one ought to check whether any changes were inserted to the original text. If we turn back to the tourist example, a potential tourist may not easily determine whether information posted on behalf of guests is indeed authentic or whether it was originated by the hotel agents or was altered by them. This may lead to a tendency to confirm information with other sources, which does not exist in the nonvirtual world and which is likely to increase the costs involved in information seeking.

These changes in the availability of information and the cost of information suggest that government intervention should assume a different nature in correcting market failures. For instance, rather than imposing disclosure duties, it may be necessary to standardize authentication means on the Internet, to facilitate name registries, to document identification means, etc. The changing market circumstances in Cyberspace, which increase the availability of information, shift attention from traditional lack of information to information overflow and the limits of human cognition. The traditional market model may prove to be insufficient for addressing the new types of information problems emerging in Cyberspace.

Externalities

Externalities are another type of market failure, and their presence in particular market situations justifies government intervention. Externality is an effect on the market the source of which is external to the market. In other words, it is a situation in which the welfare of market players is influenced by other market players, not through the market or through volumetric exchange. Positive externalities occur whenever an activity generates benefits that the actor is unable to internalize (e.g., part of the population is immunized, having a positive impact on the health of those who are not). Negative externalities occur when one's activity imposes costs on others (a polluting factory). The

[24] It was once believed that domain names could serve to identify the source of information, the way trademarks are identifying the source of goods and services. Yet, domain names have a different functionality, and are not set up for identification and authentication. Domain names are used for identifying the Internet Protocol (IP) address on the net. IP numbers indicate the "location" of the server ("host"), which is connected to the net. Because the numbers are long and therefore hard to remember, they have been replaced by names. The assignment of domain names is coordinated by IANA (Internet Assigned Numbering Authority). Top level domain names for the .com, .org. .net were once assigned by the U.S. government, and later on by a private firm, Network Solutions Inc. (NSI). Nowadays, the recently established cooperation ICANN (Internet Corporation for Assigned Names and Numbers) is responsible for managing and overseeing the system. Local registries manage and maintain national address such as .uk or .il.

role of regulation in such circumstances is to secure an optimal level of activity by facilitating the internalization of the external costs or benefits involved in the activity.[25]

Externality as an analytical tool involves several assumptions. It relies on a dichotomy between external/internal effects and, therefore, necessitates a distinction between them. To determine what effects should be considered an externality, it is first necessary to define the relevant market (or community). Effects that fall outside the scope of a particular community are considered an externality.

Another assumption involved in the externalities analysis has to do with the hierarchy of units and subunits. Externalities are defined by reference to a unit in which internal and external utility can be measured. Such basic units may be local communities, associations, corporations, unions, or even contracting parties. Such subunits are part of a unit of broader scope in which total welfare is measured. It is crucial for the economic regulatory approach to externalities to determine first what is the relevant social unit in which social welfare ought to be measured. Maximizing a community's welfare may have negative or positive externalities that affect the welfare of outsiders. The question then becomes what is the community and who are the outsiders.

For instance, state intervention is justified in regulating the activity of local authorities when such activity imposes externalities on other communities within the state jurisdiction. If we take the state as the basic unit, public policy has to be informed by the total social welfare of the state rather than by welfare on the particular, local, or sectarian utility level.[26] If we take states as self-regarding subunits, federations or international bodies become the relevant unit for measuring total welfare. Thus, the absence of environmental protection in one state may inflict negative effects on neighboring states.[27]

Defining the social unit (and therefore what should count as an externality) is essential for the market analysis because this analysis is related to questions of jurisdiction and enforcement.[28] It is assumed that self-regarding units will reflect their total social utility,[29] but they will not reflect the utility (positive or negative) inflicted on nonconsenting parties outside the community. Therefore, the definition of the social unit will determine which body (local government or state government, firm or unions,

[25] For instance, by taxing the player whose activity imposes negative externalities or by subsidizing an activity that involves positive externalities. These remedies and the general analysis of externalities can be attributed to the French economist Pigou (1920).

[26] For example, a polluter in one community may affect individuals in other jurisdictions. Such externalities are not internalized by decision-makers in the regulating community. When the total efficiency of both units is thought of, this will often lead to inefficiencies or to suboptimal regulations.

[27] On economic analysis of international law based on externalities analysis, see Dunoff and Trachman (1998).

[28] Trachtman (1998) argues that "the role of jurisdictional rule is to internalize externalities to the extent desired or, alternatively, to provide clear enough allocations of jurisdiction that it may be reallocated (and externalities thereby internalized to the extent worthwhile) through transactions between states."

[29] The assumption that governing bodies (the state) are capable of determining the total social utility is not shared by all models of externalities. Dahlman (1979) identifies two models of externalities in the economic literature. According to the first model (entitled by Dahlman the "Walrasian general equilibrium approach") government intervention is justified when real-world allocation of resources diverges from a Pareto-optimal allocation that would be likely to result from a competitive equilibrium in a transaction-cost-free world. The second model views externalities as a function of transaction costs. This model takes into account the costs of third parties associated with the removal of negative externalities. If the value placed by such parties on the removal of an externality is lower than the cost associated with its removal (transaction cost), then such externality will not be removed. Thus, real-world allocation reflects an attainable optimum. Consequently, there is a far less room for government intervention.

states or international bodies) should have the power to regulate any particular behavior. In other words, questions of externalities are in fact questions of jurisdiction.

We believe that Cyberspace challenges some of the assumptions underlying the viability of externality analysis, inasmuch as it blurs community (market) boundaries. Drawing community boundaries in Cyberspace becomes a complicated task, and, as we have seen, the externality analysis requires such a demarcation. Territorial borders often define such boundaries, and the territorial state is usually the unit in which total utility is measured. Yet, territorial borders may no longer serve in Cyberspace to define community boundaries. Cyberspace reduces the effect of physical location.[30] It creates virtual communities that do not exist in any particular geographical location. Consider, for instance, an on-line discussion group. Information may be stored on a server in one location (or several servers in different locations). Participants may reside in various states and may be connected to equipment located at yet another location. Every message posted on a Web site may be viewed, heard, or otherwise experienced by individuals in different geographical locations simultaneously. Networks and servers are equally accessible from everywhere, regardless of their location and distance from one another.[31] Participants in on-line exchanges often do not even know (and sometimes cannot know) the physical location of the other party. Cyberspace is therefore "everywhere if anywhere, and hence no place in particular."[32]

The borderless nature of Cyberspace can have very different implications for the analysis of externalities in the traditional unit of state and for the analysis of externalities in Cyberspace itself. When the basic units are the traditional geographical units, Cyberspace can be held to increase externalities. For instance, if Finland's laws allow anonymous remailers[33] within its jurisdiction, users who reside in other states, including those states that prohibit such remailers by law, may use remailers located in Finland to send anonymous messages.[34] Such messages may allow the users to violate the law or to engage in a harmful activity without being caught, thus imposing an externality in their municipal unit. The effects of on-line conducts are no longer linked to any particular physical location in which the conduct occurred.[35] Such effects are randomly distributed within various geographic locations. If a neo-Nazi site operates in Holland, for example, its offensive content is equally accessible to users around the world, thus creating externalities in all jurisdictions.

This observation, and especially its implications for the enforcement of laws of the territorial states in Cyberspace, has led some scholars to suggest that Cyberspace should be considered an independent jurisdiction.[36] The argument goes like this: Territorial rules affecting on-line activity produce externalities that influence the welfare of individuals of other jurisdictions. To prevent such spillovers, Cyberspace should be looked at as an independent unit for which the net defines its community boundaries. Utility should be maximized within this community, and attempts to regulate it by territorial governments are no longer justified.

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[30] See Post (1996).

[31] This is a function of the speed at which information travels, and the digital character of that information, which does not decay over time and distance. See Post (1996), p. 18.

[32] Lessig (1996), p. 1404.

[33] Remailers are simply intermediary computers that strip off identifying information from the original message (name and address).

[34] See Hardy (1997).

[35] See Post (1996), p. 3.

[36] For example: Johnson and Post (1996) and Post and Johnson (1997).

This argument is valid insofar as municipal regulation can increase externalities in other jurisdictions because of Cyberspace. It is, however, insufficient regarding externalities caused by Cyberspace in the context of geographical units, regardless of the intervention of municipal authorities in the activities on Cyberspace. In other words, even self-regulating Cyberspace (which might be justified for other reasons, such as the efficiency of self-regulation in Cyberspace and the narrow effect of market failures) is likely to increase externalities in physical jurisdictions.

On-line communities overlap with real-world communities, without the possibility of a clear distinction being drawn between them. Individuals who occupy the Internet necessarily live in physical communities. People who send E-mail, use chat rooms, sell computer programs, and consume on-line music also live in physical communities.[37] Their willingness to purchase a book in the neighborhood bookstore may be affected by their visit to an on-line bookstore offering books at a lower price. A libelous message posted on-line may have harmful consequences on one's career in the real world. Visits to pedophilic Web sites may affect users' behavior toward their physical neighbors. Users who read about their government's actions over the net may change their views regarding their representatives. In other words, on-line experience may affect prices and markets, social relations, community standards, and politics in real-world communities. Spillover effects, therefore, necessarily occur between virtual and real-world communities.[38]

A separate level of analysis focuses on externalities within Cyberspace, or where the relevant unit of analysis is Cyberspace. The complexity of defining the basic unit and subunits for analysis is amplified by the low cost of exit and the dynamic nature of overlapping markets (communities) in Cyberspace. Cyberspace is a network of networks. It consists of overlapping on-line communities, such as discussion groups on USNET, LISTSERVES, subscribers to service providers, users of on-line chats, players of games on a Web site, subscribers to ICQ, etc. Such communities may vary in the level of their members' homogeneity,[39] the duration of membership (one-time players or a long-term relationship among members), or the communication structure of interaction among community members (moderated or nonmoderated, open and public, or intimate). Some believe that this communal diversity in Cyberspace no longer requires the adoption of a single set of rules that would apply to all. Instead, various communities may adopt different (even contradictory) sets of norms from which users may choose. It is therefore suggested that the coexistence of communities will facilitate a market for norms. Users will join on-line communities in which community rules ultimately suit their preferences.[40]

Diversified communities also exist in the real world. What make Cyber-communities different are their malleability and the ease of changing membership. Members may simultaneously belong to a large number of on-line communities and also may switch

[37] For a pictorial description of this overlap see Lessig (1996), p. 1403.

[38] Consider, for instance, a user who downloads obscene materials. Assume that such materials violate a standard of the community in which she physically lives and are prohibited under local law. These materials may, however, conform with the values of the on-line community to which she belongs, and to the community standards in the place from which the materials were originated. Affiliation with an on-line community allows one to avoid the social bargain achieved in one's community.

[39] Lemley (1999).

[40] David Post (1996) demonstrates this argument with the example of the rule imposed by AOL (No Spam) representing the collective will of the subscribers. If it does not, subscribers would "vote with their electrons" by switching to another provider.

communities. This is because the costs of "virtual exit"[41] in Cyberspace are relatively low compared with the costs of exit involved in leaving one community and moving to another in the real world.[42] Consequently, communities in Cyberspace are dynamic to an extent that makes it difficult to treat them analytically as identifiable units. The low costs of exit suggest that externalities in Cyberspace may be substantially reduced. If a community adopts a policy that inflicts positive externalities on another community, its members would join the other community as well. If a rule of Community A imposes costs on Community B, members of Community B will move to Community A. In other words, if the costs of switching from Community A to Communities B to Z are zero, the members of Community A will internalize the costs and benefits that may be imposed by their actions on outside communities.

To sum up, applying the framework of externalities in the context of Cyberspace results in two very different outcomes. Within Cyberspace, our analysis tends to conclude that externalities cannot be regarded as a market failure that justifies central intervention. With regard to the traditional geographical units, the analysis tends to conclude the opposite, namely, that Cyberspace increases externalities but also that the conventional solution of central intervention to internalize the externalities would prove ineffective. Given the diffuse and dynamic nature of communities in Cyberspace and the increased overlap among communities on-line, it is unclear whether conventional externality analysis can continue to be a useful analytic tool. In the absence of a clear definition of communities, the analysis does not offer a solution to the question of whether the government (and which government) should intervene to correct the effects of externalities.

III. Transaction Cost and the Law in Cyberspace

Cyberspace in a Coasian World

Transaction costs were not considered in the traditional microeconomic model as a separate market failure.[43] Indeed, what is analyzed today under the category of "transaction cost" overlaps with some of the traditional market failures, especially externalities and lack of information. Transaction cost analysis, therefore, can be seen as a second generation of law and economics. The focus on transaction cost within the economic approach to law emerged after the seminal paper "The Problem of Social Cost" by Ronald Coase (1960). The paper criticized the conventional theory with regard to externalities, arguing that in a world with no transaction costs, contractual negotiations will eliminate externalities and will drive the market to efficient solution without central intervention. Only when transaction costs are not zero is there a need for such intervention. In this analysis, Coase referred mainly to costs of negotiation. A decade later Calabresi and Melamed (1972) took the analysis a step further, expanding the notion of transaction cost to include also enforcement and adjudication costs. They put forward a model in which assignments of property rights and enforcement methods are determined according to the structure of transaction cost. The current paradigm of transaction cost economics is much broader. It is associated with neoinstitutional law and economics, which views the transaction as the basic unit of economic analysis and,

[41] Burk (1999).

[42] Compare, for instance, the cost of moving to a new neighborhood, changing a club, or switching jobs with the cost of leaving an unsatisfactory on-line service or migrating to a new on-line community.

[43] For an historical survey of transaction cost economics, see Mercuro and Medema (1997), pp. 147–156.

hence, attributes attention to various factors surrounding this unit as transaction costs. These include information, enforcement, governance structures of firms, political and other collective decision-making structures, and more.

This wider framework of transaction cost economics is of great importance to Cyberspace. As we argued before, the application of traditional market analysis to Cyberspace is at least incomplete, as basic assumptions of the traditional analysis, such as the existence of defined markets and the existence of central governments with various intervention powers and enforcement abilities, cannot be applied to Cyberspace. The market of Cyberspace, its community, and its governance are different from the territorial state. The new transaction cost economics recognizes that all these factors cannot be exogenous to the economic analysis and must be taken as integral components of the discussion.

The effect of Cyberspace on transaction cost is controversial. Some argue that transaction costs in Cyberspace are lower.[44] They emphasize the reduced costs of searching for information, exchanging information, and the fast and efficient transmission of information. Thus, parties may efficiently search the Web for information on their counterparts: other businesses in which they are engaged, the background of their executives, or the history of their products. Parties may efficiently find out what other products or services are available at what price and under what terms. If transaction costs in Cyberspace are lower, Cyberspace is likely to facilitate more transactions.

Others believe, however, that transaction costs in Cyberspace may remain intact.[45] The human (cognitive) cost of engaging in a transaction, paying attention, learning the different options, defining preferences, and making choices may remain the same. In fact, if the volume of transactions increases, due to the decrease of transaction costs of the first type, then transaction costs of the second type may increase.[46] That is something we all experience on a daily basis. The vast volume of information available at all levels requires an increasing portion of our time to process it. The second (cognitive) type of transaction cost also may decrease with the increasing availability of technological means that undertake some of these functions. Such tools may automatically perform some of these "cognitive" tasks, such as sorting information, comparing options by various measures, and reflecting preferences in choices.[47] Nevertheless, users' attention will be necessary for defining preferences for automated agents, providing them with enough information, and monitoring their output.

The Calabresi-Melamed Model in Cyberspace

The Calabresi-Melamed framework focuses on the structure of transaction cost as determining the efficient method of protection of entitlements. More specifically, it considers the protection of entitlements by property rules versus such protection by liability rules. Property rules ought to be preferred when negotiation costs are lower than the administrative costs of an enforcement agency or a court determining the value of the entitlement. In such cases, central intervention ought to be minimal. Entitlements will change hands through a voluntary exchange in the market in which

[44] For example, see Sunstein (1995), Easterbrook (1996), and Trachtman (1998).

[45] Lower transaction costs entails price cuts. At least one study suggests that prices on the Internet are generally higher than prices of identical products sold by retailers with physical stores and that price variance is higher for Internet retailers. See the study of Bailey and Brynjolfsson (1998) on Amazon.com and Barnes & Noble bookstores.

[46] Trachtman (1998).

[47] See Allen and Widdison (1996).

the state's role will be only to prevent bypassing the market through the tools of injunction and criminal law. A Property rule will grant the holder of the entitlement an injunction prohibiting an injurer from causing her any harm. Thus, an injurer can cause damage only if he buys off the victim.

Liability rules ought to be preferred when the costs of establishing the value of an initial entitlement by negotiation are higher than the costs of determining this value by an enforcement mechanism. In addition, liability rules might be preferred in order to avoid bargaining costs. Lack of information or uncertainty as to the cheapest avoider of costs is likely to point us, according to Calabresi and Melamed, in the direction of liability rule as well. Liability rules involve additional central intervention by a state organ that decides on the objective value of the entitlement. In this case, if the victim has the entitlement, he has the right to be compensated, but he cannot prohibit the injurer from causing harm.

Cyberspace has two important features that are relevant in the context of the Calabresi-Melamed model. First, negotiation costs, which include the costs of identifying the parties with whom one has to negotiate, information costs, the costs of getting together with the relevant party, and the costs of the bargaining process, are significantly lower than in the nonvirtual world. Second, enforcement can be 100% effective with no involvement whatsoever of police, courts, or other central institutions. Effective enforcement can be achieved through codes of access.[48] Instead of injunction against trespass, a Cyberian can implement a system of passwords. Instead of trying to enforce rules of behavior, one can use software that defines the terms on which one gains access. The PICS software, for example, enables individuals to build self-designed censorship on materials they receive.[49]

This effective enforcement by the code refers to property rules and not to liability rules. It seems that enforcement of the latter rules in Cyberspace by courts in a conventional manner is much less effective than in the nonvirtual world, as it is always possible to cross geographical boundaries and to disguise the physical identity of the infringer. The traditional territorial-based jurisdictional rules face a major problem in having to deal with activity in Cyberspace. This activity is almost always multijurisdictional, and Cyberians do not even know where physically the bits that translate their activity in Cyberspace pass.[50] Courts might be so ineffective that the idea of "virtual magistrates," who are likely to be much more familiar with Cyberspace practices, was put forward.[51]

The discussion above leads us to the conclusion that applying the Calabresi-Melamed model to Cyberspace results in a strong preference for property rules over liability rules, and because these property rules can be self-enforced by technological means, no central intervention would be required. This is an interesting conclusion, because it means that even when transaction costs are not zero, central intervention may not be desirable. Support for this conclusion can be found from a different direction—the transaction costs of exit. Johnson and Post (1996, p. 45) argue that these costs are so low that the regulation powers of governments and the desirability of such regulation will be minimized.[52]

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[48] See Lessig (1996), p. 1408, and Reidenberg (1998).

[49] See Reidenberg (1998), the text accompanying footnotes 27–38.

[50] see also Hardy (1997).

[51] See Gibbons (1997), p. 535.

[52] For an opposing view, see Lessig (1996), p. 1406.

Standard Form Contracts as an Example for Transaction Cost Analysis in Cyberspace

A special case, but an important one, for the implications of transaction cost in Cyberspace, is standard form contracts. The traditional economic justification for the enforceability of standard form contracts is that such contracts facilitate a dramatic reduction in transaction cost. That is because standardization saves the costs of drafting documents and negotiating on the part of suppliers,[53] and of reading the terms over and over again on the part of consumers.[54] Such contracts are offered on a "take-it-or-leave-it" basis, often on the assumption that the terms will not be read at all.

If Cyberspace reduces transaction cost, we are likely to see more competition over the terms of transactions. Low transaction costs will allow suppliers to collect information about consumers' preferences and to tailor contract terms accordingly. Lower search costs will allow consumers to search and compare various contract terms for the same good. If in the real world consumers do not have any incentive to bargain over the terms of a contract because the costs of negotiation are prohibitively high, automated protocols in Cyberspace may create demand for new transaction terms. It is, therefore, predicted that we will see more tailor-made contracts and more diversity in terms. Furthermore, if transaction costs in Cyberspace are lower, economic justification for the enforceability of standard form contracts is weakened. Such contracts may lack the efficiency attributed to transactions reached by assenting parties.[55]

The tentative conclusions from the application of transaction cost analysis to Cyberspace are similar to those resulting from the application of the traditional market failure analysis: A significant decrease in the role and justification for central intervention. However, transaction cost analysis takes the state of technology as given. It does not take into account the possibility of changing technologies as a direct result from the choice of legal rules. Indeed, the technologies relevant to Coase's examples were not likely to change significantly as a result of changes in legal rules. This is not the case with Cyberspace, where technologies are constantly changing and the results of Coasian analysis may be different with each technological state of the art. The apparent shortcoming of the transaction cost economic approach when applied to Cyberspace is that it takes technological development as static and overlooks the correlation and reciprocity between technological developments and legal rules, which is a significant factor influencing developments in Cyberspace.

Conclusion

In this and the previous sections, we have tried to examine whether and how Cyberspace modulates the traditional microeconomic analysis of the market and its implications for the economic analysis of law. Although our analysis is far from exhaustive, we believe that the main conclusion that can be drawn from it is that whether we look at Cyberspace as the relevant market or whether we look into the traditional geographical

[53] It is arguable that the terms of transaction in any given service or product have network externalities. For instance, some restrictions on the use of information may become valuable only when applicable to all users, who may gain access to informational work.

[54] Another rationale is that standard form contracts are serving the institutional structure of the corporation. See Rackoff (1983).

[55] Transaction costs in contracts, which in the real world justify standard form contracts, may be lower in a way that will not justify standard forms contracts. This may also enhance equality and just distribution. See Gibbons (1997), p. 530.

markets—local, national, and international—and the effects of Cyberspace on them, the traditional analysis of competition, market failures, and the role of central intervention has to be significantly modified. On the one hand, Cyberspace is predicted to eliminate, or at least notably diminish, some of the common market failures. Such are some of the traditional public goods (i.e., information) or monopolies. Such are some of the nonvirtual market problems of lack of information, externalities, and transaction cost. On the other hand, Cyberspace creates some market deficiencies, which are less notable in the traditional markets. The technological race between enforcement measures by the code and countermeasures is the most significant example. Costs involved in verifying information is another.

Be that as it may, the primary inference from our discussion so far is connected to the viability of the whole project of traditional market failure analysis or traditional microeconomic theory analysis when applied to law. This conventional analysis presupposes the organization of markets, their connection with territorial-based communities, the nature and hierarchies of central government, and the means by which central government can intervene in market activities. The analysis of Cyberspace cannot be based on these presuppositions. As we have indicated, Cyberspace creates communities that are not territory-based and that have different characteristics from nonvirtual world communities. Central government in Cyberspace is constructed differently from traditional central government. Some of the means by which it can intervene in the market are also distinct. All these factors require broadening the framework and perspectives of the economic analysis of law in such a way that it will include as an endogenous variable the structure of community and its central government. For this purpose, other branches of economic analysis, such as public choice and institutional and neoinstitutional economic analysis, have to be amalgamated into our discussion. They are considered briefly in the next section, which discusses the changing concept of communities, states, and the law.

IV. Preliminary Thoughts About Neoinstitutional Law and Economics and Cyberspace

In the previous sections, we tried to show that Cyberspace challenges the traditional market model applied to law. One of the major shortcomings of the traditional analysis is its underlying presuppositions, which take as exogenous factors the existence of states, the borders between them, their central governments, and their enforcement powers. Public choice theory analyzes the emergence of the public sphere, public law, and collective decision-making. Neoinstitutional theory is the broadest framework of economic analysis insofar as it incorporates institutional structures as endogenous variables within the analysis of law. There is no doubt that this is the most suitable framework for examining the changing world of Cyberspace and the law. Cyberspace is neither a conventional territorial entity with central government nor a traditional economic market. A division between the analysis of traditional law and economics and public choice might be found as nonviable with regard to Cyberspace.[56] Therefore, we have to examine the simultaneous effects of constitutional, public law, and political features of Cyberspace with its private law characteristics.

Despite the fact that neoinstitutional law and economics seems to suit best the analysis

[56] Similar insights were argued in the case of the application of the law and economics approach to international law. See Dunoff and Trachtman (1998).

of Cyberspace, we argue that an even greater revolution is likely to occur when such analysis is carried out or when the effects of Cyberspace on nonmarket economic analysis become apparent. This section touches on some of these changes. We first scrutinize two of the major features of our organization of life in Cyberspace that are significantly different from their counterparts in the nonvirtual world. We then focus briefly on law, norms, and their enforcement in Cyberspace.

Ingredients of the Organization of Life and Their Transformation by Cyberspace

The economic approach, as the broader liberal paradigm, bases its analysis on rational individuals who are the atoms of society and on collective organization units, such as states, which are artificial and instrumental creations the sole purpose of which is to enhance individuals' well-being. Cyberspace might alter the basic notions of these two ingredients.

The traditional models of the economic approach, as in liberal theories from Hobbes to Rawls, presuppose that markets correspond to states, which are basically territorial units. A social contract or other forms of collective action are carried out by citizens of a specific territorial unit, which becomes a state or other form of national unit. Central government, its organs, and structure are analyzed in a territorial context. One of the most interesting features of Cyberspace is the bankruptcy of this territorial conception of community and, by derivation, of law.

Cyberspace breaks the territorial units from several perspectives. First, markets in Cyberspace are global. A user sitting physically in North America can do business with another user located in Asia; for that matter, no differences exist between this transaction and a virtual transaction that she conducts with a user just across the street. Second, not only business, but also community activities—discussion groups, political groups, entertainment, and so on—cross geographical borders, developing new common and distinct cultural and social norms that are territorialess. In fact, Cyberians can simultaneously find themselves members of several communities that are very different. Third, virtual activity, when translated to actual electronic bits that are transferred from one user to another, may cross many borders. Communication between two next-door neighbors may pass through several other countries. Cyberspace users cannot even know through which jurisdiction their activity is directed.[57]

Cyberspace transforms not only the notion of collective communities, but also the notion of the individual, who is the basic unit for liberal philosophy of the state and for economic analysis. In the nonvirtual world the basic unit of reference—the individual—is one person with an identity number, passport number, or driver's license number, with an address, and with distinct physical features. In Cyberspace, the atomistic unit of analysis is a user name with a password and an electronic address. There is no strict correlation between the Cyberian individual and the nonvirtual individual, inasmuch as the same physical individual can appear in Cyberspace as several entities, each with different identification features and a different character, belonging to different communities. The transformation of these two basic ingredients by Cyberspace has a bearing on the changing concept of law.

[57] See Burk (1996).

The Institution of Law in Cyberspace

There are two major aspects of law that can be affected by Cyberspace: one is law as the source of norms/rules that regulate behavior, and the way in which law is created; and the other is law as an enforcement mechanism. The following are some thoughts on how each of these two perspectives vis-à-vis Cyberspace might affect law as an institution.

Cyberspace and the Rule-Making Process. Cyberspace affects rule making in several ways. First, it allows decentralization and democratization of the rule-making process; namely, it affects the way rules are formulated. It also facilitates the customization of rules, and the coexistence of competing rules systems.

Cyberspace significantly reduces the cost of communicating and processing individuals' preferences. It makes it possible to efficiently collect information from individuals by asking them to click their preferences directly onto the screen.[58] It reduces the transaction cost involved in collecting information about preferences. Cyberspace also facilitates fast and cost-effective information processing that allows real-time feedback on public preferences and choices. This, in turn, reduces the need for agencies. The reduced cost of coordination and communication diminishes the extent of collective action problems. If transaction costs involved in coordination are low or nonexistent, there is no need for representatives—intermediaries—to reflect the aggregated will of their constituents. Individuals may directly communicate their preferences on each and every matter.

In addition, the low transaction cost may allow individuals to become organized. Cyberspace reduces the costs of identifying relevant parties, of communicating and acting together, and of spreading information that concerns all. This can lead to increased democratization and decentralization of rule-making processes, in the various stages of which Cyberspace allows groups and individuals to participate. This may allow citizens to take a more active part in governance and to effectively monitor government actions.[59]

From the perspective of economic theory, two important problematic phenomena that exist in representative democracy are toned down significantly in Cyberspace. The first is agency costs, which are associated with representative government.[60] These costs are the result of ineffective monitoring of representatives by their voters and the ability of the former to act in a self-interested manner without being penalized by the voters (or the costs of the penalties being smaller than the political or personal gains). The easy and relatively cheap access to information and the lower cost of collective deliberation and action in Cyberspace are likely to increase the effective monitoring level and, thus, to reduce these agency costs.

The second phenomenon of representative democracy is the power of interest groups to rent seek and to make gains through pressure on the representatives at the expense of the general public. Interest groups are able to succeed in their actions because of the costs of collective action. This allows only the organization of small groups whose

[58] Consider, for instance, an issue on the current agenda—whether to charge a fee for Internet domain name registry. It is possible to pose this question to all Internet users at low cost. It is also relatively easy to collect the information and process the results. If different parties have different agendas on this issue, they also can communicate their propaganda to users.

[59] See also Trachtman (1998), who argues that Cyberspace reduces the transaction cost of coordination in the private sector and in the public sector.

[60] For a basic analysis of political agency costs, see Musgrave and Musgrave (1980).

potential gain from collective action is higher than the cost of organization.[61] Cyberspace, as indicated above, tends to lower the cost of collective action, which in turn enables broader interest groups to organize, bringing more equality to the political markets and diffusing the impact of narrow interest groups.

Thus, Cyberspace allows the decentralization and democratization of rule-making processes in that it facilitates effective participation of people in setting the rules. Rules may be increasingly created from the bottom up and, therefore, may reflect the need for diversified social and economic interests by increasingly complex societies.[62]

A related issue is the potential dynamic nature of Cyber-rules and the ability to customize them at relatively low cost.[63] Customization of rules is, of course, also possible in the nonvirtual world. Contracting parties may agree to deviate from a legal default rule (but not from a mandatory rule). However, customization of rules in Cyberspace may be implemented not only through contractual arrangements but also through product design. To the extent that transaction costs in Cyberspace are lower, the customization of rules may involve lower costs.

But, customization of rules involves other cost. The costs of changing a rule in the real world are high, often prohibitively so. This is due to network externalities. Norms become more valuable as more people use them, to the extent that norms cease to require a high level of coordination. Standardized rules would reduce transaction costs (search and negotiation) of providers and users. Networks externalities provide inadequate incentives for innovative norms. Such costs would be identical in the nonvirtual communities and in Cyberspace. The costs of adapting to new rules are human costs that may not be avoided.[64]

This also holds true when we consider regulation by the code. Indeed, if rules are reflected in the technology, the cost of customizing rules or switching between different rule systems depends on the cost of the technology. If changing the rule requires modification of a standard or infrastructure, the cost may be prohibitively high. Yet, some changes (such as defining users' preferences) may be entered at low cost.[65] In any event, the cost involved in human adaptation to new rules (or technologies for that matter) may be prohibitively high.

Enforcement in Cyberspace. Another way in which Cyberspace transforms the law as an institution is related to enforcement. On the one hand, conventional enforcement (by the state apparatus) is much less effective in Cyberspace, as it is always possible to cross geographical boundaries or to disguise the physical identity of the infringer.[66] On the other hand, Cyberspace introduces new methods of enforcement that challenge traditional thinking about enforcement and transform its meaning. In a sense, technology in Cyberspace allows efficient enforcement to a degree that does not exist in the nonvirtual world.

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[61] See the classic text of Olson (1965), and in the legal context see Farber and Frickey (1991), chapter 1.

[62] For further discussion of the advantages of decentralization, see Cooter (1997).

[63] See Reidenberg (1998).

[64] See also Katz (1996).

[65] Generally speaking, digital representation is malleable and changes involve lower cost than inserting changes in other media of representation. Compare, for instance, the cost of making changes to a text that is posted on-line or on the computer screen with the cost of inserting changes in a published book. Yet, the cost of inserting changes in digitized information also may be prohibitively high. Consider, for example, the minor modification necessary to achieve Year 2000 compliance of programs. The wide scope of such changes imposes very high cost.

[66] See also Hardy (1997).

The most significant change in the context of enforcement is the ability to regulate behavior by the infrastructure of Cyberspace. The computer programs, communication design, and network architecture that constitute Cyberspace are not neutral. They reflect a certain social order, shape behavior and social interaction among users, and define the potential choices of actions available to users in Cyberspace.

Consider, for example, copyright laws. They prohibit the creation of copies without the authorization of the copyright owner. A copier will pay the owner damages for the infringing copies she has made. In Cyberspace, some programs may simply prevent the creation of uncompensated copies by using copyright management systems,[67] encryption, digital watermark, etc. Such means may substitute reliance on copyright laws.

Enforcement by the code is very different from the enforcement of rules in real-world legal regimes. Rather than defining undesirable behaviors by the law or providing incentives for a desirable behavior, regulation by the code makes it possible to prevent certain behaviors while allowing others.[68] Whereas traditional enforcement of legal rules is *ex post*, enforcement by the code is *ex ante*. The rule embodied in the code prevents the violation from occurring in the first place. Enforcement by the code does not require any law enforcement institutions such as courts and the legal system. It is self-executed and self-implemented. The same system that provides the service (such as the computer program that facilitate access to a web site) also defines the terms of access and the terms of use by preventing some uses, such as copying, and permitting others, such as browsing.

Enforcement by the code, therefore, is more efficient. It involves relatively lower cost than enforcement by the legal system. It does not involve the cost of identifying, seizing, and prosecuting violators. The costs of implementing self-help means of enforcement are lower than the administrative costs of maintaining the bodies of the legal enforcement system, such as the police and the courts. But it is not without cost; it involves the costs of developing a technology and preserving its technological superiority.

Regulation by the code further differs from the enforcement of rules in that it entails perfect performance. It does not offer users any choice of whether to go by the rule or to violate it. To the extent that self-enforcement is perfect, it may reduce the price of goods and services. Consider, for instance, the price of copyrighted works. The price has to cover not only the large investment in creating and marketing the work, but also the cost of enforcement and the expected loss from failure to enforce the rights of the copyright holder. If the expected market for a music publisher is substantially reduced due to the creation of unauthorized copies, the publisher will raise the price per copy to cover its expenses. If enforcement by the code prevents the creation of unauthorized copies, it will reduce the price of copyrighted works.

These differences between the traditional system of law enforcement and enforcement by the code raise conceptual issues regarding the notions of enforcement and regulations. The literature on technological self-enforcement regards the code as a type of regulation.[69] A preliminary question is, of course, whether it is justified to talk about regulation by the code and enforcement by the code as part of the law. Economic theory may treat technology as simply a design or an architectural constraint because the

[67] See Bell (1998).

[68] See Lessig (1996), p. 1407–1408, and Reidenberg (1998).

[69] Reidenberg (1998) endorses the *Lex Informaticia* embodied in the code as the new and modern version of the *Lex Meractoria* of merchants in the medieval ages. Trachtman (1998) refers to these approaches that endorse regulation by the code as "new medievalists."

notion of regulation under economic analysis of law assumes a choice. The underlying assumption of the economic approach to rules is that rational agents are able to control their behavior. They are motivated by their wish to maximize their utility. Rules are sometimes necessary to correct an otherwise distorted set of incentives (due to market failures) and to provide individuals with appropriate incentives so that they will choose to act efficiently. If a design simply prevents a certain behavior, we can no longer talk about regulations and incentives because there is no longer a choice by individuals for the law to promote or prevent.

However, enforcement by the code can be violated by the technology of countercoding. If we view such technological developments as possible, and if the only question about their materialization is one of cost, it is feasible to argue that, from the perspective of economic theory, the differences between traditional enforcement analysis and the analysis of enforcement by the code are not so significant as they might seem, and that we may regard enforcement by the code as part of a legal regime after all.

What are the implications of self-enforcing means (technological or social) for the question of when and how should the (traditional) law intervene? The code and the legal system overlap in that both legal regimes simultaneously apply to the same people. They may conflict with one another. They may compete with one another.

Under standard economic analysis, a law enforcement system is considered a public good that must be provided by the state. Furthermore, the state requires a monopoly over enforcement means. In most circumstances, the state will not allow competing enforcement entities to exercise their power in a way that threatens its monopoly over enforcement. Enforcement by the code is a private good. Should enforcement functions, traditionally reserved for the legal system, be privatized in Cyberspace? To address this question, it is necessary to consider several aspects of enforcement by the code.

The principle that laws ought to be public assumes that the law can affect the behavior of people, so they should be aware of it. Enforcement by the code involves serious problems of information about the rules that are embodied in the code itself. Users may not have perfect information regarding the rule that is implemented by the code. The rule, as well as the code, is not directly accessible to people.[70] Users may learn what a particular program or a design does and does not do from the way it functions. This takes time and often some expertise. It may be difficult, for instance, to find out whether Internet browsers or programs used on Web sites collect and store information on Internet users.

The traditional role accorded to the law under standard economic analysis of law is to correct market failures. In the case of a market failure, the role of law will be to alter the payoff functions of players in the market. In other words, when market processes do not function efficiently due to a market failure, the law will change the incentives attached to individuals' choices of action, and will thereby affect the strategies adapted by individual players in the market.[71] In Cyberspace, the target of regulation may become the technologies that affect users' behaviors rather than the behaviors themselves, and this is largely owing to the information problem discussed above.[72] The law may provide negative incentives to circumvent such systems to prevent the waste

[70] Take, for instance, the network services provided by Microsoft when it launched its network that allowed automatic reading of users' information on their hard drive without their knowledge.

[71] This includes, for instance, imposing fines and liability rules.

[72] See Reidenberg (1998), who suggests that *Lex Infromacia* should become the target of regulation instead of direct regulation of the behavior itself—for instance, the promotion of technical standards.

involved in a technological race for security and anti-security means.[73] Legislation may as well prevent implementing a certain technology altogether.[74]

Cyberspace is leading to globalization, effectively decreasing municipal regulations and territorial sovereignty.[75] This may cause transformation not only of law but also of the framework of the national state. In the future, technological zoning will create new communities, from which different laws might emerge, but which will be in increasing competition with the nonvirtual community.[76]

V. Concluding Remarks: The Transformation of the Economic Approach to Law by Cyberspace

In a symposium on intellectual property in the age of Cyberspace, held at the University of Chicago, Judge Frank Easterbrook cooled the enthusiasm of the participants by stating that to talk about the law of and in Cyberspace, or, more particularly, to talk about property in Cyberspace, the topic he was asked to address, was just like talking about the "law of the horse." Cyberspace does not, according to Easterbrook, alter the basic tenets of legal theory or of the economic analysis of law. Those principles can be applied to Cyberspace just as they are applied to any specific legal situation. So, just as Dean Casper of the Chicago Law School refused to offer a course in "The Law of the Horse" there was no justification to reconstruct legal theory just because we had entered an era of extensive usage of computer networks.[77]

We beg to differ. Easterbrook's analysis overlooks an important insight about scientific theorizing: the paradigm shift. This insight is based on the path-breaking work of Thomas Kuhn (1962) on scientific revolution, which teaches us an important lesson about theorizing in general. A general theory is constructed on the bases of presuppositions, which set the boundaries for the academic discourse. These boundaries, entitled "paradigm," also assist in assigning new findings to their "right" place, in their interpretation and evaluation. Occasionally new findings are discovered or new phenomena occur that do not fit neatly or naturally into the conventional framework and are forced into it unnaturally. With the passage of time, more and more such findings are revealed and at a certain stage we witness a collapse of the presuppositions, which brings about a paradigm shift, namely, a new conceptual framework for analysis.

If this description of scientific development is true for the exact sciences, it must be even more accurate for the science of economics, because the heart of the methodological foundations of economics consists of underlying assumptions on which the economic analysis is constructed. Economic analysis, unlike natural science, does not even pretend to analyze the real world. It seeks to analyze a simplified world. Thus, the simplifying assumptions are crucial for the insight of the analysis and the conclusions

[73] For example the recently enacted U.S. Digital Millenium Copyright Act prohibits the manufacture or making available of means of circumventing technological measures protecting the rights of a copyright owner. 17 U.S.C. Section 1201(b)(A) (1998). This approach is also reflected in the World Intellectual Property Organization (WIPO) Copyright Treaty and the WIPO Performances and Phonograms Treaty, adopted at the WIPO Diplomatic Conference in December 1996. Under the treaty contracting parties are required to provide legal remedies against circumventing protection measures and against tampering with copyright management information.

[74] The law may prohibit a program that allows invasion of private exchanges (reading all E-mails from any workstation). However, the law may do nothing and, thus, requires individuals who wish to protect their privacy to encrypt their messages.

[75] See, on the American jurisdiction rules and their inapplicability to Cyberspace, Burk (1996).

[76] See Lessig (1996), p. 1409.

[77] Easterbrook (1996).

drawn from it with regard to the "real" world. If the arguments of this article can be summarized in one main idea, it is that Cyberspace challenges the current paradigm and ought to make us reconsider the basic creed of the economic analysis of law.

Crudely, one can describe the economic analysis of law as comprising three layers or stages, which can be perceived as separate paradigms of sorts: the traditional Chicago school economic analysis of law, the transaction cost economic analysis of law, and the neoinstitutional economic analysis of law and legal institutions. In Section II of this article we applied the traditional market failures analysis of the Chicago school on Cyberspace. Two important general conclusions can be derived from this application.

First, conventional problems of market failures diminish significantly in Cyberspace. In the framework of the Chicago analysis this means an optimistic conclusion that Cyberspace can operate efficiently with no need for central intervention. This is indeed the direction Frank Easterbrook points at. However, we showed that new types of failures, which can generally be associated with technology, replace the traditional market failures. In other words, much of the market failure analysis is contingent on the state of a particular technology. The public good nature of information, whether it is excludable or nonexcludable, is relative to a specific technological state of the art. The accelerated pace of technological change makes a public good a "moving target." Traditional remedies offered by the economic approach in the form of property rights may no longer be effective. Although Cyberspace reduces the traditional causes of monopolies, it introduces new types of monopolies that are the consequence of control over technologies rather than prices and demand curves. Thus, solutions for this new type of market failures cannot be derived in a straightforward way from the traditional models of central intervention in the market.

Second, the Chicago model assumes territorial jurisdictions with central governments that are able to intervene effectively in the market through financial policies and regulation. These assumptions do not hold in Cyberspace. Cyberspace breaks territory-based markets. The strict correlation between markets and states, or between forums that facilitate private contracts and public forums of collective decision-making, does not exist in Cyberspace. We believe, therefore, that the Chicago paradigm cannot be of much help in analyzing law in and of Cyberspace.

The Coaseian analysis of law and economics, which views transaction costs as the sole factor diverting the market from efficiency, also assumes a given state of technology. The efficient outcome depends on the availability of technologies and their costs. Transaction cost analysis takes as given that one party may exercise technology that may increase the value of the resource or may lower the cost inflicted by harmful use, but it does not take into account the possibility of changing technologies as a result of the legal rule. The Cyberian world is very different from Coase's example of straying cattle that destroy crops growing on neighboring land. In the latter, technological change as a result of change in the legal rule is, indeed, a remote option. In Cyberspace, technologies are constantly changing the substance of a legal rule that may indeed affect technological development and vice versa. The apparent shortcomings of the economic approach are that it takes technological development as static and overlooks the correlation and reciprocity between technological developments and legal rules. The introduction of new technologies has a dialectic relationship with other processes. The legal rules and market processes may directly affect the types of available technol-

ogies by explicitly prohibiting the use of certain technologies by law[78] or by providing incentives to particular technologies and not others. Technology should, therefore, become endogenous to the analysis, and the economic discourse should be expanded to address it.[79]

There is no doubt that the most suitable framework for examining the changing world of Cyberspace and the law is the current generation of economic analysis of law that can be associated with the neoinstitutional paradigm. However, even here we believe that the developments in Cyberspace may require some fresh thinking on the level of the whole project. Two points ought to be mentioned.

First, neoinstitutional law and economics emphasizes the connection between the political and institutional structures, on the one hand, and the market activity, on the other hand. One of the most significant features of the Cybermarket is its development against the background of a lack of concrete political and institutional structures. One of the most innovative characteristics of Cyberspace is that its norms are developed from the bottom up. The borders between private and public, between markets and hierarchies, are not as clear as in the nonvirtual world. These features pose some challenges, which have never been addressed even by the neoinstitutional approach to law and economics. This approach can show how certain political structures may influence markets and laws; it has not shown how lack of structures may do the same.

Second, Cyberspace accentuates some weaknesses that exist in the shadow of the neoinstitutional endeavor with regard to the nonvirtual world and are brought to light in the virtual world. One of the major points of criticism against the whole project of economic analysis is that it is based on the assumption of rational behavior. We do not wish here to repeat and elaborate the general critique along these lines against this presupposition; we would like to conclude with a few preliminary thoughts about the special challenges posed by Cyberspace to this paradigmatic assumption. Economic analysis assumes that the players have preferences that are exogenous to their contractual and collective public activity. It also assumes that perfect information will enhance rational choices that will meet players' individual preferences.

One of the important features of Cyberspace is that it provides almost unlimited information. In fact, lack of information can no longer be held as effecting irrational behavior; perhaps the contrary is true. There is so much information that a need for processing tools for information arises. In the nonvirtual world, there are significant gaps in information, and there is diversity within society and between societies that creates different sets of information that are affected by given preferences—political, cultural, and linguistic. By contrast, Cyberspace is characterized by uniformity. The

[78] For example, the Digital Millennium Copyright Act, which prohibits the use of technologies allowing the circumvention of copyright management systems.

[79] The causal relationship between technological progress and social-economic processes is controversial. Technological determinism maintains that technological development progresses by its own inertia out of the self-contained logic of scientific or technical necessity. Social choice theory maintains that technological development is the outcome of a conscious social choice. The approach we suggest here emphasizes the reciprocal relationship between technological and social processes, perceiving both as driving a change. Lessig (1996) argues that Cyberspace design at any given moment is a manifestation of an ideology and, therefore, reflects the choices made by administrators. Research and development introduce developers with options that require them to choose particular technologies over others, defining a research agenda and setting priorities and preferences. However, the fact that there are some options from which one could choose, and that there are alternative designs and architectures, does not mean that the choice of every particular design reflects an ideology. Some aspects of the design architecture may depend on technological breakthroughs, luck, or incremental development that has matured. Thus, technological development is not entirely controlled and manipulated.

whole world becomes a small global village, with a common language and cultural identities. Ironically, this combination of endless information and homogeneity might affect the independence of individuals, in general, and their preferences in particular.

Although individual preferences in the nonvirtual world are taken by the law and economics approach as exogenous to the political process and to the economic markets, Cyberspace requires us to internalize even the analysis of individual preferences. Fresh thinking, if not a fresh paradigm of economic analysis, has to emerge in which these basic presuppositions with regard to rationality and preferences will be internalized. Such thinking would help us to assess whether Cyberspace is a forum that creates much more free choice or is a tool for suppressing independence and limiting freedom of choice; whether technology sets new horizons for individual and collective well-being or patterns our individual character, our self, by the same universal agents for all; whether it enhances communication of diversities or may cause the disappearance of the diversity that in the nonvirtual world fosters the definition of the unique self, leaving us with a brave new homogeneous human being.

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